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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

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WEDNESDAY, MAY 31, 2006

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ROCKVILLE, MARYLAND

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The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

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P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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Docket Number:	(not applicable)
Location:	Rockville, Maryland
Date:	Wednesday, May 31, 2006
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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

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WEDNESDAY, MAY 31, 2006

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ROCKVILLE, MARYLAND

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The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

+ + + + +

WEDNESDAY, MAY 31, 2006

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ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

AGENDA ITEMS PAGE

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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Docket Number:	(not applicable)
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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

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WEDNESDAY, MAY 31, 2006

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ROCKVILLE, MARYLAND

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The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

AGENDA ITEMS PAGE

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

+ + + + +

WEDNESDAY, MAY 31, 2006

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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Docket Number:	(not applicable)
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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

+ + + + +

WEDNESDAY, MAY 31, 2006

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

+ + + + +

WEDNESDAY, MAY 31, 2006

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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Docket Number:	(not applicable)
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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

+ + + + +

WEDNESDAY, MAY 31, 2006

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

AGENDA ITEMS PAGE

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8 \ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH

REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

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WEDNESDAY, MAY 31, 2006

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ROCKVILLE, MARYLAND

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The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

AGENDA ITEMS

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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Docket Number:	(not applicable)
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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

533rd MEETING

+ + + + +

WEDNESDAY, MAY 31, 2006

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met in Room T2B1 at Two White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Graham B. Wallis, Subcommittee Chair, presiding.

MEMBERS PRESENT:

GRAHAM B. WALLIS	Chairman
WILLIAM J. SHACK	Vice Chairman
GEORGE E. APOSTOLAKIS	Member
J. SAM ARMIJO	Member
MARIO V. BONACA	Member
RICHARD S. DENNING	Member
THOMAS S. KRESS	Member
OTTO L. MAYNARD	Member
JOHN D. SIEBER	ACRS Member-At-Large
JOHN LARKINS	Designated Federal Official

ACRS STAFF PRESENT:

HANS ASHAR	NRR
DANIEL FRUMKIN	NRR
ALEX KLEIN	NRR
THOMAS KOSHY	EEEB/DE/NRR
MICHAEL MAYFIELD	DE/NRR
GEORGE MORRIS	EEBE/DE/NRR
LINH TRANS	NRR
GEORGE WILSON	NRR
ROBERT WOLFGANG	NRR
ROY WOODS	RES

ALSO PRESENT:

HAROLD BARRETT	Duke Power Company
MIKE FALLON	Constellation Energy
ALEX MARRION	NEI
DAVID MISKIEWICZ	Progress Energy

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order.

This is the first day of the 533rd meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will consider the following:

Draft Final Generic Letter, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations, Draft Final General Letter, Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems, Interim Staff Guidance on Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Containment Drywell Shell, and Preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Alex Marrion, NEI, for time to make oral statements regarding the Generic

Letter on Post-Fire Safe-Shutdown Circuit Analysis and the Generic Letter on Inaccessible or Underground Cable Failures that Disable Accident Mitigation Systems.

A transcript of portions of the meeting is being kept and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. In the items handed out to you, I notice that there is a speech by Commissioner Yatzko at the beginning. And at the end, there is an interesting article on various matters which complicate PWR sump evaluations.

Now in the middle of the day, we are going to have ethics training which is why the lunch break is so long today. And the ethics training is scheduled for between 12:15 and 1:30 so you should be here at 12:15 and ready to be trained in ethics.

That is the end of my prepared remarks. And I'd like to proceed with the meeting. Call on Rich Denning to get us started on the first item.

MEMBER DENNING: Thank you. We will be hearing from the staff regarding the draft final

generic letter 2006-XX, Post-Fire Safety-Shutdown Circuit Analysis Spurious Actuations. The Committee will hear presentations by and hold discussion with representatives of the staff.

Additionally, Mr. Alex Marrion with NEI, has requested ten minutes to share NEI's perspective after the staff's presentation.

The Committee had requested to review the generic letter regarding Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations after the public comment period. We did not have a prior subcommittee meeting on this letter which may have been a mistake.

I have serious reservations about the balance between regulatory burden and approved safety associated with this letter. The letter leaves open options for risk informing this process but they are not easy activities to perform. So we are anxious to hear what the staff has to say on this. And to have a healthy discussion, I believe.

We have a considerable period of time actually to do this, three hours. But I think that we will want to look into this letter very carefully before giving our blessing.

I think we are now ready to hear from staff. And I'll turn it over to Alex Klein of the

Office of Nuclear Reactor Regulation.

MR. KLEIN: Thank you very much. My name is Alex Klein. You see on the cover slide here my branch chief's name, Sunil Weekakkody. He extends his regrets for not being able to attend today's meeting in that he had a prior commitment for jury duty today. With that, I'm acting in his place so I will give the opening presentation.

The purpose of today's meeting and the presentation to the Committee is to present the final draft of Generic Letter 2006-XX, Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations. We are also here to obtain ACRS endorsement to issue the proposed generic letter.

I'd like to introduce the two primary staff members who will present today for NRR. To my left if Robert Wolfgang who is the primary author of the generic letter. And to my right is Daniel Frumkin, fire protection engineer, from the Office of NRR, who will speak to you about some of the NEI and EPRi fire testing.

We also have in the audience with us supporting staff members from NRR who were also instrumental in the development of this generic letter.

As an overview, I wanted to advise the Committee that there is a lot of history leading up to this generic letter. And you will hear some of this today. We did a bounding analysis, full of risk. We also did a regulatory analysis of the generic letter. But at this time, those slides are not in our presentation. But we are certainly prepared to discuss those aspects.

MEMBER DENNING: We absolutely would like to see those slides.

MR. KLEIN: Very good.

So the probability of spurious actuations due to fires will be presented by Dan Frumkin after I speak. And then after Dan speaks, we will receive a summary of the objectives of the generic letter by Bob Wolfgang.

Again, based upon the long history of this generic letter and so forth, there has been differing views between the industry and the NRC on the credibility of multiple spurious actuations. You will hear about the NEI/EPRI cable fire test results from Dan Frumkin, as I indicated.

I also wanted to indicate to the Committee that we are continuing with our inspections using risk-informed aspects. For example, RIS 2004-03,

certainly one of the goals of issuing this generic letter is to reestablish compliance with the regulations.

That concludes my introductory remarks. And I'll hand over the presentation to Dan Frumkin.

CHAIRMAN WALLIS: When you present, could you make it clear to me just what it is you are asking industry to do because I had a lot of trouble figuring that out. There is a lot of sort of rather vague requirements it seems to me. And perhaps you can in your presentation make it clear just what it is they have to do.

MR. KLEIN: Yes.

MR. FRUMKIN: Good morning. My name is Dan Frumkin from the Office of NRR. I work for Sunil. And today I'm going to present some of the background from the NEI/EPRI testing that is discussed in the generic letter.

I see some new faces around the ACRS table so I'm going to pass around some tables from some testing that occurred. At the end of the cables that are fused together, you will be able to see two failure modes or examples of two failure modes. One is an inter-cable which is two cables -- or actually one is an intra-cable, which we use these terms intra

within a single cable and inter between two separate cables. And this provides an example of both.

The highlighted portions within a cable are very close together that have failed together. And then we also have intruding cable that has penetrated the outer jacket and apparently the inner cable protection and come at least into very close contact which you can see.

We will talk also about the different types of cable. This is a thermal plastic cable, which is the more vulnerable cable, but as you can see, that it is subject to both failures from internal and external cables when put under the suitable heat or fire exposure.

So I'll be providing some background on the testing that provided the insight into the failure likelihoods, the objectives of that testing, some details of the testing, some of the test results, and a few conclusions based on the testing.

And then Mr. Wolfgang will be talking about the generic letter more specifically.

The NEI/EPRI testing was intended to address fire-induced circuit failure issues of concern to the NRC staff, principally the potential for spurious operations of equipment.

This was intended to basically bring to close the question that the staff kept on bringing up that Browns Ferry had these and the industry said that well, it is very unlikely to occur. So this was intended to bring that to a close.

NRC witnessed the testing and also did some insulation resistant testing using Sandia National Laboratory resources.

And there are four documents that either in whole or in part document the results of some of the testing. The characterization of fire-induced circuit failures results is the big report from EPRI.

The circuit analysis failure modes and likelihood analysis is the Sandia Report of their insulation resistant testing.

These results were pulled into the NUREG 6850, which is the fire protection re-quantification or the fire PRA methodology for nuclear power facilities. This is the state-of-the-art document that Research has developed to -- it is a handbook on how to do fire PRA.

And then there was the spurious actuation expert elicitation which was experts reviewing the testing and coming up with results.

The objectives, as I said, was to research

the characteristics of fire-induced circuit failures to better understand these plants' responses to cable failures. And, as I said, the NRC also was involved in the testing and reviewed -- witnessed the testing and did their own insulation resistant testing.

So the details of the test, there were 18 fire tests that were conducted between January 9th, 2001 and June 1st, 2001 at the Omega Point Laboratories in San Antonio. And the three types of fire exposures were tested during the test. The hot gas layer region which is up at the ceiling level, the fire creates a buoyant plume and it fills the enclosure from the top down. And that is the hot gas layer.

Then below -- between the fire -- the actual fire and the hot gas layer is what we call the plume region where there is no flaming but that is a very hot part of the -- that is the hottest part of the smoke region of the fire.

And they also tested a radiant exposure where you get close to the fire itself or sometimes worst case could be up next to the plume region depending on emissivity of the smoke and the radiant energy coming off. If it is a clean burning flame, it may not have a high radiant energy but the smoke may

be higher. So -- but they just used, I believe, a fixed radiant number but that is a little discussion of the radiant energy.

One thing that they didn't do that I will add is they did not put cables in the flaming region. That is why I have this highlighted. We, the staff, hear a lot from the licensees about how long it takes to have these cables fail. And that there is plenty of time in all situations for mitigation.

And based on the testing, yes, in a lot of the testing there was a lot of time before there was failure in, you know, 30, 40 minutes for some of the tests. But none of the tests tested this flaming region.

So this leaves the staff a very strong question of how fast -- well, first we don't know what failures will occur in that region. They could occur. They may not occur. We don't have the information.

It is very clear that if they do occur, they will occur much more quickly. The temperatures are over, you know, much -- a thousand degrees hotter in the flaming region. And there is also an ignition source. So it is a very different phenomenon. And cables could be exposed to a flaming region in the plant.

So this test is not a complete picture of -- or let me just say that the timing factors that came out of the testing that was done are not a complete picture of the possible scenarios that could occur.

MEMBER APOSTOLAKIS: It appears that you were participating in the conduct of these tests. Did you express these concerns to EPRI when they were designing the tests?

MR. FRUMKIN: Well, I wasn't specifically involved in that. I don't believe that the test was intended to develop timing. And as such, it wouldn't have been an issue. The licensees or the industry has brought this timing issue and perhaps inappropriately based on the testing.

It is useful to heat this cable slowly because then the hot shorts would probably exist for a longer period of time. But whether this -- but my only point is that I don't believe that this testing provides a basis to say that hot shorts -- this test I don't think was intended or can provide a basis for timing. But I believe it is being applied or some intend to use it to show that there is a timing issue.

MEMBER APOSTOLAKIS: I would be such an obvious thing to do. I mean there must be a reason

why they didn't do it. Do you know that? Or should we ask Mr. Marrion when he comes?

MR. FRUMKIN: Why they didn't do the flaming region? Yes, that is a fair question. But I believe the answer -- like I said, I do think that that was not -- if there hadn't been any failures outside of flaming region, I think there would have been a strong feeling that failures in the flaming region would have been maybe less likely. But it is a fair question.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Does the material from which the insulation is made, does that actually burn at some temperature?

MR. FRUMKIN: Yes.

CHAIRMAN WALLIS: But if you stuck it in a flame, you would expect the insulation itself to catch fire.

MR. FRUMKIN: Yes. The ASTM -- or, I'm sorry, the IEEE 383 fire test that has been the standard fire test is actually a burning test. And it ignites the flames from the bottom in a vertical cable tray. And all the cables do catch on fire when exposed to flame. But some of them propagate more or less slowly.

There are some specialized cables that don't catch on fire but those were not tested. Those aren't what we are talking about here.

So the results of the tests showed with some confidence that failures within multi-conductor cables are likely and when they do occur, they occur in multiple conductors within the same multiple conductor cable. So as you can see from that cable bundle, there may actually be more than one cable conductor within the cable further down the jacket that you can't see.

And then the way they are spiraled together in there so that various cables could come in contact with other cables within the same cable. Various conductors could come into contact with other conductors within the same cable.

In addition, multiple devices were shown -- the spurious actuation data showed that a single hot short within a multi-conductor cable usually effected actuation devices simultaneously. If there were two devices -- I believe the way they set this test up is they wanted a very practical approach.

So they actually put -- rather than doing similar to the Sandia testing where they used an insulation-resistance device, they used actual plant

equipment, which they just plugged it in as they would in the plant and if it would actuate or not actuate. So it was a real pragmatic thing and they did actuate. And as the testing showed, some actuated simultaneously.

MEMBER MAYNARD: Did they also measure how long the signal stayed there? Or how long it actuated?

MR. FRUMKIN: Yes. And most of the hot shorts were of a short duration. And some were in the order of minutes, I believe.

This is a table of results of the best estimates given cable damage of a spurious actuation probability. And the purpose of this table is not to -- the purpose of this table is just to show that the NRC and the industry -- or at least the results from the EPRI report which was developed by industry, are very consistent.

The staff and the risk people in industry really are on the same page with the likelihood of spurious actuations. There are some factors of two here, differences, but in probabilistic and likelihoods, in that world it is a small difference.

CHAIRMAN WALLIS: This is strange to me. It must depend on the extent of the damage. I mean if

you just burn a cable for a short time, nothing happens. If you burn it for long enough, you are going to get shorts. So you can't just have a probability. It is going to depend on the extent of the damage to the cable.

MR. FRUMKIN: Yes. In all these, cables were exposed to damage. So this is given that these cables were damaged.

CHAIRMAN WALLIS: But to what extent?

MEMBER APOSTOLAKIS: It is a critical probability. I mean -- or, as you said earlier --

PARTICIPANT: At some point the probability is one, right?

MEMBER APOSTOLAKIS: I mean there is a 0.6 conditional probability that you will have a spurious actuation. This is conditional on the probability that the cable is damaged.

MR. FRUMKIN: Correct.

MEMBER APOSTOLAKIS: And what is that?

MR. FRUMKIN: That depends on the scenario. For example, if a cable is a foot above a piece of switch gear or let's say -- and this is not an unlikely situation -- a foot above 20 or 30 feet of switchgear. It runs across the cable tray, across the top of a number of pieces of switchgear, what is the

probability?

Well, that could be calculated typically, I think, a single piece of switchgear is five times E to the minus five. Or, you know, in that range. But then it certainly would be damaged if there was even a small fire in that piece of switchgear.

So there is -- you could have cable -- and then that same cable does go through different areas where it could be exposed to different other fires. A single cable could go through three, four, five different areas and be exposed to a dozen different fire scenarios.

MEMBER DENNING: I think we have to recognize the context within which this is done, George. And I think it is important when we try to get into the question of risk informing this and that is basically we are doing a deterministic safe shutdown analysis in which you assume there is a fire in a zone -- in a fire area. And it can burn there for three hours. You know even though there are other mitigating things that would clear that, we assume it can burn for three hours.

So then the question is well, with this massive potential exposure, then you have got a cable running through there. What's the potential that it

could then be heated up to a point at which you get this kind of interaction? You know it doesn't get at all into the questions of you have a fire in a room, what is the possibility that any cables are exposed, you know, before it is controlled.

MEMBER APOSTOLAKIS: But if we are doing a deterministic analysis, why are we calculated spurious actuation probabilities?

MEMBER DENNING: Well, let me give my view but I'd certainly like to hear your view, and that is that the question is not so much whether you can have spurious actuations but how many can you have? How many combinations of things can you deal with?

The industry has always agreed to looking at a spurious actuation on a one-at-a-time basis, you know. And so I think that what the staff is trying to do is to give the feeling that -- or their impression that this isn't the really rare event -- the extremely rare event that actually would have some kind of spurious actuation occurring.

And then I think by implication then maybe there is the potential for multiple spurious activations.

MEMBER APOSTOLAKIS: Well, the second bullet of the previous slide, I guess, is then the

key, right? Is that what -- of devices?

MEMBER DENNING: Well, I would be curious. What is your -- if you were answering that question, how would you have answered George's question? Why are we looking at probabilities here now?

MR. FRUMKIN: Well, okay, maybe this slide was poorly planned. But the point of the slide is twofold. One is to say that with regard to probabilities, the staff and the industry people who do this work are on the same page.

And the second reason, I guess, is to show that these probabilities are very high in probabilistic space, that some of them are close -- you know, 0.6, and then if you have a 0.6 scenario and you have two 0.6 scenarios, you've got a 0.36 scenario. So that even multiple can be a fairly high probable.

MEMBER DENNING: Now help us though -- you can't say that without giving some conditionality of --

MR. FRUMKIN: Right.

MEMBER DENNING: -- 0.6 conditions on what?

MR. FRUMKIN: Cable damage.

MEMBER DENNING: Cable damage.

MEMBER ARMIJO: I have a problem with cable damage. Is this severe? Moderate? I have no feeling of -- I can see where all the insulation is burnt to a crisp and I would call that severe. Wouldn't these probabilities all be one?

MR. FRUMKIN: No. Well, okay, so what this is talking about is the spurious actuation probability, not shorting situation. This is the likelihood of a hot short occurring within a cable without that cable shorting to its conduit or cable tray because generally once the hot conductors fail to the conduit or cable tray or the nearest ground, then they would certainly -- that would clear the spurious actuation.

MEMBER MAYNARD: Okay. But I think there is a high probability if you make all the assumptions to get to this point. But you also have to factor in the probability of actually having a fire, for the fire going that long, for the operators not taking any action. There are a lot of other things getting up to that point that when you put it all in context --

MEMBER APOSTOLAKIS: That is why I'm confused. We are either doing deterministic analysis or we are doing risk analysis. If we do risk analysis, then, of course, we have to do all this. If

we do what Rich said, then it seems to me they are gone.

I mean you have three hours. Everybody is burning, right? I think as I recall from the early studies on this the real question is whether you will have a short -- a hot short first before an open circuit.

MR. FRUMKIN: Right. Before the short ground.

MEMBER APOSTOLAKIS: That is the critical thing.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: And this is not answering that, is it?

MR. FRUMKIN: Yes, it is.

MEMBER APOSTOLAKIS: It is?

MR. FRUMKIN: This is the likelihood of that spurious actuation probability, not a short to ground.

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: This is one spurious actuation.

MR. FRUMKIN: This is a single.

CHAIRMAN WALLIS: A single one although there are multiple wires in the cable?

MR. FRUMKIN: Right. Well, this is a spurious actuation getting cable to damage within a cable or between -- there is an inter-cable factors here -- between two cables. So the point -- let's just say the 0.6 here is for within a single thermoset cable, the 0.2 or the 0.4, as the 6850 has it, is between -- or generally it is 0.3 is what has been used a lot -- is between two separate thermoset cables within the same tray.

And what the previous slide was trying to say is that within a single thermoset -- within a single multi-conductor cable, that more than one of the conductors are going to fail together with an 80 percent likelihood. So it almost for sure that if let's say you have one hot conductor and four control conductors that could actuate four different pieces of equipment, that hot conductor will come into contact probably with all of them with the same likelihood, with this same 0.6.

CHAIRMAN WALLIS: Oh, with the same likelihood?

MR. FRUMKIN: Yes. It's not a 0.6 times 0.6 times 0.6 in the same cable. Within that cable it is 0.6 times 0.8, if you will.

CHAIRMAN WALLIS: Okay.

MR. FRUMKIN: So it is still -- it is almost 0.6.

MEMBER DENNING: Why are the inter-cable probabilities the same for thermal plastic and thermoset?

MR. FRUMKIN: Because -- oh, you mean this and this?

MEMBER DENNING: Yes.

MR. FRUMKIN: Inter-cable -- yes, I'm not -- that's just a -- well, intra-cable is very likely --

MEMBER DENNING: Intra-cable, I understand that.

MR. FRUMKIN: Yes, I don't -- I don't have --

CHAIRMAN WALLIS: What is the question, Rich?

MEMBER DENNING: It's thermoset is less likely -- one would think thermoset would be less likely to have inter-cable and perhaps they are the same here because there just haven't been any experiments done on a thermoset.

MR. FRUMKIN: I think that is it because you can see that that is one of the big differences, a factor of two here, and again the same factor of two

for intra-cable -- inter-cable -- but yes, we're -- as Roy Woods is here, and we're doing more testing on this. But this is currently the state-of-the-art data on this.

And I can't explain the -- it's just that is what the data showed from the limited 18 tests.

CHAIRMAN WALLIS: Now we are talking about whether you are doing probabilistic or deterministic analysis. When we get to the generic letter, there are strange terms such as saying the licensee must assume the possibility of simultaneous multiple spurious actuation -- well that tells me nothing.

I'm assuming the possibility -- it says nothing about whether it is likely to be one or 0.6 or whatever.

MEMBER DENNING: What they are saying is one.

CHAIRMAN WALLIS: What does it mean?

MEMBER DENNING: It means one.

CHAIRMAN WALLIS: So possibility means a probability of one?

MEMBER DENNING: That's -- yes.

CHAIRMAN WALLIS: That wasn't clear to me at all. Okay.

MEMBER APOSTOLAKIS: We will come to the

letter, I guess.

MEMBER DENNING: Yes. Continue.

MR. FRUMKIN: These are just some notes on the previous slide that some of the plants that use the CPTs, which are the control power transformers, that reduces the likelihood of spurious actuations.

MEMBER APOSTOLAKIS: All of these probabilities, of course, mean nothing now.

MR. FRUMKIN: Right, yes.

MEMBER APOSTOLAKIS: They are one.

MR. FRUMKIN: Okay. Well --

MEMBER DENNING: But we are going to get to risk informing at some point here.

MR. FRUMKIN: Absolutely. Right. So those were just notes on the previous slide which was unfortunately put in here.

In conclusion, a review of the test data readily illustrates that hot shorts often involve more than one conductor. And that concurrent hot shorts within a cable are probable and should be considered during circuit analysis.

That's the end of this presentation. And the point of this is just to lay the groundwork that simultaneous spurious actuations and simultaneous multiple spurious actuations have been shown by

testing, by industry testing, to occur.

MEMBER DENNING: Now there is more testing that is in progress. It is your feeling that that testing could then -- will it be done within a time period where we add value to the licensee when the licensee is basically responding the generic letter?

MR. FRUMKIN: Yes, that testing is planned to be done by the end of the year. And that pool of data will be available -- certainly for risk-informed evaluations for the licensees to use. But the experts doing the testing don't believe that there is going to be -- they believe these numbers are going to be honed.

They believe that there are going to be more cable combinations tested here than in the 18 EPRI tests -- EPRI/NEI tests. But they don't believe that for the information that was on that table are going to be changed by an order of magnitude. It's maybe a 50 percent change or something of that nature.

MEMBER DENNING: If we have time later on, could we have a short presentation by someone about what is still to happen? And what different configurations basically have been untested at this point that will be tested?

MR. FRUMKIN: Well, Roy Woods is sitting

behind you. And I'm not sure if he is prepared to talk about this testing.

MEMBER DENNING: Let me say I'm not asking for you to do it right now. But do you think you could do it later?

MR. WOODS: Sure. Roy Woods, RES. Yes, certainly we can make a presentation to you whenever you want on the testing. The plans are well made. We are about to start within days or a week at most. It is actually about to happen.

MEMBER DENNING: Okay. Well, let's go ahead --

MR. FRUMKIN: I think they want something later this morning, right?

MEMBER DENNING: Yes, later this morning. Absolutely, yes. Later this morning.

MEMBER APOSTOLAKIS: That's what happens when you have three hours.

MEMBER DENNING: Right, yes. Thanks. Can you run any of those tests by eleven?

MR. WOLFGANG: My name is Bob Wolfgang. I'm a fire protection engineer in NRR. And I'm going to give you information on the draft generic letter Post-Fire Safe-Shutdown Circuit Analysis Spurious Actuations.

A summary of the presentation, I'll go over the purpose of issuing the generic letter, the information we are requesting from licensees, the background on this issue since 1997, the basis for the generic letter, the issue that is clarified in the generic letter, public comments, and a summary at the end.

The purpose of issuing the generic letter is to clarify how the NEI/EPRI cable fire test program reaffirms long-held regulatory positions and provide part of a foundation for licensees who are planning to transition to NFPA 805.

Also, to respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to --

MEMBER APOSTOLAKIS: Excuse me. Are you going to come back to these? I mean this on slide 16, the foundation for licensees planning to transition, will you elaborate on these later? Or can you tell us a few words now?

MR. WOLFGANG: Well, that's --

MEMBER APOSTOLAKIS: Why is that relative to NFPA 805?

MR. WOLFGANG: This is just to show that multiple spurious actuations should be included in

their risk analysis model.

MEMBER DENNING: Well, since George has raised the question, let me ask it now. And that is NFPA 805 is one of the ways -- transitioning to NFPA 805 is one of the ways that a licensee can respond to this. Now my question is how long does it take to transition to NFPA 805?

And I don't quite understanding within the time periods of the 90 days and six months and this kind of stuff, within the context of a transition to NFPA 805, when did that transition actually have to occur for the licensee to be able to use that pathway?

MR. WOLFGANG: All they have to do is respond to us within I believe it is the 90 days. That they are transiting to NFPA 805. And they will take care of this situation during that process.

MEMBER DENNING: Then how long would they have to transition to NFPA 805?

MR. WOLFGANG: They have -- what is it? Is it three years?

PARTICIPANT: Three years.

MEMBER DENNING: Three years?

MEMBER APOSTOLAKIS: Yes, it is a long time.

MR. KLEIN: Let me describe briefly. This

is Alex Klein. Let me briefly describe the process a licensee would use if he wants to transition to NFPA 805. And that is once the licensee had made the determination that he does want to transition to 805 because that is an option for him, if he submits a letter of intent to the agency indicating that that is what he wishes to do.

At that point, we review that letter and make a determination as to whether or not the schedule that the licensee has laid out is acceptable to the Agency. And what we have right now in place is a three-year time frame for licensees to transition with the option of extending that time frame if the licensee can provide us with sufficient justifications beyond the three-year time period.

Now within that three-year time period, a licensee would submit their letter of intend, do the act of transition into NFPA 805. And then before that three-year time period is over, we would submit their license amendment to the staff for our review and approval prior to them actually receiving the amendment.

MEMBER APOSTOLAKIS: It seems to me that the -- actually is the first bullet in the previous slide that is important because the licensee that

wants to transition to NFPA 805 has to convince you, I think, that they complied with all the regulations, right? There may be a few exceptions, as I remember for a period of time, and all that.

So the primary reason seems to be to reaffirm long-held regulatory positions because somebody who wants to transition has to demonstrate that they complied with all that.

MR. KLEIN: That is correct. Really I think the primary purpose of the generic letter is that first bullet on that slide 16.

MEMBER APOSTOLAKIS: Right, right.

MR. KLEIN: Yes. As an added benefit, it does provide the foundation for licensees who want to transition to 805.

MEMBER DENNING: Now wait a second. I definitely did not understand this. I mean clearly there are a lot of licensees out there that did not -- cannot respond to multiple spurious actuations. And they are not going to have to bring their plant into compliance with having to meet all the multiple spurious actuations before going to NFPA 805 because then NFPA 805 doesn't help them at all, right?

MR. FRUMKIN: Yes, that is correct. And what Dr. Apostolakis was saying is correct is that we

have an enforcement discretion in place so those licensees who discover during transitions that they are not in compliance can do a risk analysis of that and determine that it is not red, that it is not wilful, that it is not a severity one violation.

And, therefore, they can comp it -- put compensatory actions in place and move forward towards transition without necessarily correcting that in accordance with the old fire protection program.

MEMBER DENNING: But one thing that I think is an issue though and that is suppose there is a plant out there that would really like to do the NFPA 805 approach but within the 90-day period, don't they have to go through the entire analysis and identify the SSCs that are potentially vulnerable based upon this detailed multiple spurious actuation evaluation which seems to me like an extremely difficult problem to undertake.

Is that true that they have to really analyze the whole system within 90 days according to this multiple spurious actuations and identify vulnerable SSCs? Am I correct or not correct?

MR. WOLFGANG: Well, they have to -- well, I'll get to that on a slide here.

MEMBER DENNING: Okay, if you will get to

it, you can go ahead.

MEMBER MAYNARD: I would like to challenge that first statement just a little bit though. And I know that it has been a long-held position by members of the staff but as far as, you know, NRC position, there are a number of licenses that were issued and plants inspected and with their programs were approved and licensed without making this assumption.

And I'm not convinced that it has clearly been a recognized regulatory requirement. And again, I know licenses were issued, programs were reviewed without making -- otherwise, we wouldn't even be here today if those licenses weren't issued at that time. So I would challenge that. The first statement.

MR. WOLFGANG: We know SERs have been issued for Byron and Braidwood with a single spurious actuation per fire event. And we've come to the conclusion basically that was issued as a mistake. That was a mistake.

MEMBER MAYNARD: But I know that there are a lot of plants out there a license. Their analysis were reviewed, their programs were reviewed. I know I was personally involved with them back in the `80s when some of these issues were starting to come to a highlight. And I know that there are a number of

plants out there with licenses that although it may not be documented as clearly, that it was known that multiple spurious actuations were not taken in account in that analysis.

I don't think it is clear that this is just confirming compliance to requirements that were in place. I think it is a different set of assumptions.

MR. FRUMKIN: Yes, and this may, I agree that your assumptions apply to probably a number of plants out there. But for the most part, Appendix R, 10 CFR 50, Appendix R, Section 3(g)(ii) and 3(g)(ii) which is the alternate and dedicated shutdown are what is in question.

The NRC went in and did an analysis of the 3(g)(iii) alternate shutdown. And for a lot of 3(g)(iii) which is, for lack of a better description, a control room abandonment, they allowed the assumption of one spurious actuation. 3(g)(ii) wasn't across the board inspected in the 80s. It was assumed that licensees could wrap or protect or would have adequate separation.

And it wasn't evaluated for multiple spurious because generally the staff didn't believe that -- well, I'm not sure why they didn't do it. But

the big question was this alternate shutdown.

And in the 90s, we had the thermal lag. And a lot of that wrap was taken out. And a lot of manual actions or assumptions were put into place. And I don't mean to say that there was -- well, the point that I am trying to make is that there was another change. There was the removal of a lot of these thermal lag which was relied on to protect cables and probably would have mitigated many spurious actuations, many multiple spurious.

MEMBER MAYNARD: And I'm not saying at this point that they shouldn't be considered now. I'm challenging the regulatory positions that says all along everybody should have always done this. I think that, you know, we're now setting, you know, these are the things that definitely need to be considered.

If those were considered 20, 30 years ago, if that was part of the regulatory position for the licenses, we wouldn't have gone through a 20-year period here of trying to figure out what it really requires the licensee to do. Again, it's a regulatory -- I believe that this is something that falls within the backfit.

It needs a better analysis overall. And that doesn't mean that it is a bad thing to do. I'm

just saying that I do not believe that we can take the position that this is a requirement that has already been there, that everybody should have already done. And that is kind of what we are saying in this generic letter.

MR. KLEIN: This is Alex Klein of NRR. I just wanted to add to the discussion here that -- and Bob can clarify this also for me -- is that the generic letter did receive CRGR approval. We did go to that Committee.

There are subsequent slides in Bob's presentation, I think 23, 24, 25, that does talk about the background, the regulatory background that you are speaking of that might clarify some of these discussion questions.

MEMBER MAYNARD: I'd be glad to look at that.

MR. WOLFGANG: Well, and also attend CFR Part 50, Appendix R, it also talks about you have to consider hot shorts. It doesn't set a limit on the number.

MEMBER MAYNARD: Well, I understand that. But there is a number of the regulations that come to an agreement between the licensee and staff as to what are -- what do you have to assume in a number of those

things.

So anyway, we will get into it maybe aq little more with the regulatory evaluation. But I do not agree that --

CHAIRMAN WALLIS: Well, could we clarify this first bullet? I mean it seems to me that if we did have this long-held regulatory position, which was being enforced, then you wouldn't need this generic letter.

MEMBER MAYNARD: Right.

CHAIRMAN WALLIS: So something has changed as the result of these tests. So maybe there was a position which wasn't very well enforced or something or was not properly interpreted by the industry. Is that the problem?

MEMBER MAYNARD: Or the staff?

CHAIRMAN WALLIS: Well, the staff, yes.

MR. FRUMKIN: Well, I think we -- well, Bob, I think I would say that something did change. And that thing may not have been entirely the tests. I think that the staff had high confidence that these fire barriers that were installed were separating these redundant trains.

And they were removed and they were replaced with non-barrier solutions which were

analysis, manual actions, and those type of things. And as soon as the NRC started inspecting post-thermal lag fixes, which was in 1997, well before these tests. We had numerous -- there was an information notice 97-something which presented numerous hot short and multiple -- well, numerous alternate associated circuits and circuit failure type issues.

So to hang this entirely on the test is not -- certainly the staff position goes before -- to before the tests. And that has been documented in that generic -- that information notice and there was a letter sent to NEI which expressed this sentiment well before -- I believe that was before the test as well.

CHAIRMAN WALLIS: The purpose of the generic letter is to reinforcement your enforcement which you were a bit lax about before or something? Is that what its purpose is?

MR. WOLFGANG: There was a lot of confusion. You were talking about 3(g)(iii) about alternative and dedicated shutdown systems and the use of one only -- you had to consider one spurious actuation there --

MR. FRUMKIN: Right, 3(g)(iii) and the Generic Letter 86-10 talked about spurious actuations

quite a bit but the staff position is that those didn't apply to 3(g)(ii) and they were erroneously applied to 3(g)(ii), which is all we're really talking about right now. We are not talking about these 3(g)(iii) inspections that occurred in the 80s. We're not talking about the 3(g)(iii) approvals.

Every 3(g)(iii) program should have been approved with an SER. That was the policy. But we did not go into the 3(g)(ii) areas because the barriers and those solutions should have been sufficient.

MEMBER MAYNARD: It just seems to me that with all the confusion that has gone on for a number of years on this, a much cleaner way of doing this is if the NRC believes that this is something that needs to be done is just to come out with it as a requirement following the process for rulemaking, for changes, or whatever rather than trying to handle it through a generic letter requesting information to show compliance with a very confusing set of requirements.

MEMBER-AT-LARGE SIEBER: I suspect, though, that the staff does not believe that rulemaking is required, that the proper regulations already exist.

MR. FRUMKIN: That is correct.

MEMBER-AT-LARGE SIEBER: In the review process that the staff has used in the past does not establish new regulations. The regulations are the regulations. And how the staff reviews something is another matter.

MEMBER MAYNARD: Well, how they review it but what it is accepted as to your certain assumptions and things --

MEMBER DENNING: I'm sure we are going to come back to this issue. So why don't you go ahead --

MEMBER-AT-LARGE SIEBER: It won't go away.

MR. WOLFGANG: Okay, moving to the next slide, more purposes of issuing a generic letter, respond to the Agency's need to provide clarification and closure of outstanding fire protection issues, respond to the licensee's request to provide clarification of regulatory expectations, and respond to the region's request to provide clarification of regulatory expectations for circuit inspections. And circuit inspections were resumed January 2005.

Generic letter, what information it is requesting from the licensees. Within 90 days to evaluate their licensing basis and information in the generic letter regarding multiple spurious actuations

in the Post-Fire Safe-Shutdown Circuit Analysis.

MEMBER MAYNARD: Is that practical to expect -- I think we might get into a little bit more as to what we are really asking here but within 90 days, for the whole industry to do this, I'm sure there is going to be some resources -- external resources needed in some cases.

With the whole industry trying to use those, is 90 days really a practical time frame to get what is really being asked for here?

CHAIRMAN WALLIS: Well, we believe that it is. But, you know, I guess when NEI talks, they have a consensus from the industry that it is not a sufficient time, We can always adjust that.

MR. WOLFGANG: Yes, I think what is being asked here is not for the technical evaluation of the entire circuit analysis. What we are asking for is for licensees to report whether they have a multiple spurious licensing basis or they have a single spurious licensing basis.

For those plants that have a multiple spurious and haven't' analyzed for multiple spurious, then that is going to be a long-term fix. All we are asking them to do is to report their situation within 90 days, which is a licensing --

MEMBER DENNING: Wait a second. How do they submit their functionality assessment of effected SSCs without doing that total analysis? Am I missing something here? And this is within 90 days, if you're not in compliance, you have to submit this functionality assessment of effected SSCs.

MEMBER APOSTOLAKIS: And compensatory measures.

MEMBER DENNING: And compensatory measures. I think that is the whole analysis, isn't it? I mean you don't necessarily know how you are going to ultimately correct them but it seems to me that the analysis has to be done in 90 days.

Incidentally, I should have mentioned that listening in is EPM, which is a company that does this kind of stuff. But I should have mentioned that earlier that we do have an open line here.

I'm sorry, go ahead.

MR. WOLFGANG: Yes, what we are asking -- yes, to submit the functionality assessment of effected SSCs.

MEMBER DENNING: Yes. How do you determine what SSCs are effected unless you have looked at the multiple spurious actuations.

MR. WOLFGANG: Yes, they have to look at

the multiple spurious actuations.

MR. FRUMKIN: First, I agree with the member that doing a full analysis for 104 plants in 90 days is not going to be credible. This is a major effort to look at that.

I believe though that the second bullet of compensatory measures for these areas where the plants are capable of putting compensatory measures and then solving the problems in a long-term program. That is credible. That is possible.

MEMBER APOSTOLAKIS: It seems to me that the 90 days applies to the first bullet but not the sub bullets.

MEMBER MAYNARD: I think it does a -- it certainly applies to the first bullet.

MEMBER DENNING: But the sub bullets are there in the generic letter.

CHAIRMAN WALLIS: Well, why is there an assumption that they are not in compliance now? I mean that they have done various things today to meet the regulations already. And their position would probably be we are in compliance now. So what are you asking us to do?

MEMBER DENNING: No, I don't think so.

MEMBER-AT-LARGE SIEBER: Well, if you took

the lag out of your plant --

CHAIRMAN WALLIS: That's the problem. They have changed something.

MEMBER-AT-LARGE SIEBER: You changed the configuration.

CHAIRMAN WALLIS: That is okay. So they have changed something. Thank you.

MEMBER DENNING: It is not just that, Graham. They have argued that this has not been the requirement. That you didn't have to do multiple spurious actuations. They did one at a time or a single. So they would argue this is not the regulatory -- they would argue that it is new requirement but kind of like Otto has.

MEMBER KRESS: But the regulation says broadly that under these conditions, you have to have one train of safe shutdown. And that can only be interpreted as multiple spurious actuation I think.

MEMBER MAYNARD: I don't think -- I don't agree with that. Through the regulatory process, you don't necessarily have to assume everything that anybody could ever conceivably come up with. And so that's why the NRC and the industry -- but you decide on a set of assumptions. And what you really have to assume to reasonably meet that requirement.

And then as new information comes along, if those previous assumptions weren't conservative enough, you may need to do that. But that really constitutes a change there. Otherwise why would you have any guidance documents or any -- what is allowed to assume or whatever. So I would argue that it is part of it.

MEMBER DENNING: In some respect, this is an open-ended problem in terms of, you know, and so it begs for some kind of guidance as to where you end the search for things that can go wrong.

Continue.

MR. WOLFGANG: We are asking that within six months to submit the plan to return all effected SSCs to compliance with the regulatory requirements. And that is the plant modifications, license . Exemption request.

And we are also asking that within 30 days, if you cannot meet the 90-day, six month schedule that we are requesting, you provide us notification you cannot meet it and your suggested schedule and completion date.

CHAIRMAN WALLIS: What kind of things would they do to come into compliance? Are they going to change these offending cables? Are they going to

change the way in which they put out fires? Are they going to change the actual equipment in the SSC? It is very open ended what they are expected to do.

MR. WOLFGANG: Yes, they can protect cables. They can reroute cables. They can submit license amendments based on a risk analysis method -- those type of things.

CHAIRMAN WALLIS: Manual actions?

MR. WOLFGANG: Well, not in 3(g)(ii) space. There are a lot of ways.

MEMBER DENNING: I don't know how expensive those ways are. I mean we say there are lots of ways but those ways may be extremely expensive.

CHAIRMAN WALLIS: Well, I'm also unclear about what it is they are supposed to assume can go wrong? When I read these things about they are supposed to assume the possibility that this can happen, it goes back to Otto's question here.

I mean if you assume the very worst that could possibly happen, then you could have enormous changes in the plants in order to avoid this worst conceivable thing. Is that what you are asking them to do?

MR. WOLFGANG: You have to assume all

multiple spurious actuations.

CHAIRMAN WALLIS: Well, but that is a major thing, isn't it?

MEMBER MAYNARD: That is major.

CHAIRMAN WALLIS: You have to assume that it happens with the probability of one?

MR. WOLFGANG: Yes.

MEMBER-AT-LARGE SIEBER: Yes. On the other hand --

MR. WOLFGANG: 3(g)(ii) in deterministic space doesn't limit the number of --

MEMBER-AT-LARGE SIEBER: On the other hand, you restrict the fire to a single fire area, which means that if you have appropriate separation or fire barriers that you have a train that is free of fire, that will operate.

MR. WOLFGANG: Right.

MEMBER-AT-LARGE SIEBER: And that is the principle. I think it is going to vary dramatically from plant to plant, especially based on the age of the plant and the type of plant. I think some are going to be tremendously impacted. Some others may not. And again, depending on what assumptions you really have to make and what credit you can take for things you already have in place, things that have

already been done, everything from operator actions to fire loadings, improvement in fire control, everything.

MEMBER DENNING: And, Jack, you talked about the separating of trains. And that's, you know, pretty straight forward. But isn't the real open endedness related to the spurious actuations where there is some unanticipated valve opens that effective give you a loss of coolant accident or something like that, that, you know, introduces a different element to safe shutdown. Isn't that the open-endedness that makes it so difficult.

And I also don't know whether -- how many plants really know what cables are in what trays within a room.

Obviously if you are going to do -- yes so that you basically are assuming anything within the room -- I mean you know that -- you have concluded that it has gone through a room up to this point. But, you know, they could be in totally different trays in the room. But you don't know where they are in the room.

CHAIRMAN WALLIS: Well, you have to assume that they are all together and they are all --

MEMBER DENNING: Assume that you have to

submit it. But I don't know the answer to that.

MEMBER KRESS: Assume that you have to do it. But I don't know the answer to that.

MR. WOLFGANG: Well in a fire area in a room, if you assume a fire, you have to assume everything is --

MEMBER KRESS: Yes, but can everything have an inter --

CHAIRMAN WALLIS: Everything in that room can short together?

MEMBER KRESS: -- can it short together as an inter-cable connection even though it may be way separated?

MR. FRUMKIN: No, if it couldn't occur, then it wouldn't be -- I mean you wouldn't have -- we wouldn't be expecting energized cables to penetrate conduits. We wouldn't expect energized cables to jump from tray to tray.

Or, for example, DC current has to have the same path. If it is not in the same tray or same conduit you couldn't actuate that from an AC circuit or something of that nature.

MEMBER DENNING: I don't know whether -- what utilities know what cables --

MR. FRUMKIN: Right, no, you are correct.

MEMBER DENNING: -- are in what trays you were going to run.

MR. FRUMKIN: And that can be a very significant effort.

One of the aspects is that for the 3(g)(ii) area -- or for the 3(g)(iii) plants, some of the older plants are 3(g)(iii). And they don't have very much separation at all. But they have done a significant analysis that was reviewed in the 80s which we referred to earlier. And they do have the -- because they have done that detailed analysis, they have the flexibility to do manual actions.

So in effect, the newer plants with the good separation should be fairly well off. The older plants that had very little separation probably have done a lot of this analysis already and may already be in compliance.

It is the middle plants that are more likely than the older plants to have the circuits traced. But they are kind of in the middle there. And they are the ones who I think are going to be having a more difficult time answering this generic letter.

MEMBER-AT-LARGE SIEBER: That is a pretty limited number of plants then. This issue is, you

know, I was a young man when this issue came out. The work has been done. And the plants that were built in the 80s, to my knowledge they all had pull tickets associated with cables when they were originally routed.

So you just run your computer and it tells you whether you've got separation or not. And if you don't, what circuits are offending circuits.

MR. FRUMKIN: Many plants have that. Or some plants have that.

MEMBER-AT-LARGE SIEBER: Some plants have it. Some plants had to do that all manually, hand over hand.

MR. FRUMKIN: But I just want to add one thing that the staff has come our with a statement -- or, well, not really a statement but what 3(g)(ii) says is that when cables of the redundant trays are within the same fire area and are not protected, so if you have a area with train A equipment in it and no train B equipment or the train B is protected in accordance with 3(g)(iii) protection criteria, we're not -- so with the train B protected, we're not limiting the actions that -- the feasible and reliable actions for failures on train A.

So if you have a protected train outside

of a fire area or protected with 3(g)(ii), the licensees can do feasible and reliable manual actions on the fire-effected train to let's say close that valve that opens spuriously or stop that pump that opens spuriously because there is a full -- typically from the control room, so there is good annunciation and indication, there is a full protected train outside of that fire-effected area.

And I'll just point to Alex and see if he nods at me. Okay, yes.

MEMBER-AT-LARGE SIEBER: And there is very limited amounts of equipment if you had a spurious actuation, would cause another accident like a LOCA. Some value opens in the valve is -- like a safety injection value, is designed to pump in not pump out.

Okay, so there are check valves and things like that that would prevent that. But there area few cases -- PRVs for example --

MR. FRUMKIN: Yes, PRVs is one I was thinking of if you --

MEMBER-AT-LARGE SIEBER: Yes , that could open and --

CHAIRMAN WALLIS: New plant designs have this screw valves. And the spurious actuation of them create a LOCA.

MEMBER-AT-LARGE SIEBER: Yes, but they have them so you get to a safer condition, right?

CHAIRMAN WALLIS: One question I was going to --

MEMBER-AT-LARGE SIEBER: It is just expensive to do it.

MEMBER DENNING: Yes, is there any kind of assessment as to what fraction of spurious actuations actually are deleterious as far as effecting safe shutdown capability? I mean has anybody in a risk study done that kind of an assessment? Or do you have any feeling as to the fraction of spurious actuations that will get you into trouble?

MR. FRUMKIN: Well, you asked for that. We have this bounding analysis that we did and you actually -- well, you have to look at a lot to find the ones that are going to give you problems from a spurious actuation standpoint. But in our bounding analysis, it took five pairs of spurious actuations in order to get a significant risk.

And it is because these spurious system -- these multiple spurious effect systems that, you know, are the redundant train. So it effects both -- the train, the productive train or the unprotected train, and the redundant train so you really lose all your

protection with these scenarios. And it doesn't -- you have to look at a lot to find the bad players. And there don't actually have to be a lot of bad players, at least based on our bounding analysis for it to be of fairly high risk significance.

MEMBER DENNING: Continue please.

MR. WOLFGANG: Background since 1997, multiple LERs brought lack of consensus concerning circuits to the staff's attention. And this led to a moratorium on inspection of circuit issues back in 1997.

In 2001, NEI/EPRI cable fire test demonstrated that multiple spurious actuations can occur. And they can occur in rapid succession or simultaneously without sufficient time for mitigation in between.

Therefore if a licensee doesn't account for multiple spurious actuations, and its circuits analysis, the licensee may not be in compliance with 10 CFR 50.48 and 10 CFR Part 50, Appendix A, General Design Criteria, and (3) which require that a licensee provide and maintain free from fire damage, one train of systems necessary to achieve and maintain the safe shutdown.

Staff has developed the risk-informed

approach to inspections to focus on risk-significant configurations based on the cable fire test. And this is RIS 2004-003.

MEMBER DENNING: Now let me ask with regard to that, I understand that that was prepared for inspection as opposed to compliance.

MR. WOLFGANG: Correct.

MEMBER DENNING: But is there a real reason why one couldn't use guidance of that type for compliance as well? Do you see a regulatory constraint that would prevent you from -- I mean from the regulations that exist now, do you think it would be incompatible for the staff to provide the equivalent, perhaps a perturbation off of that or perhaps a revision to NEI's risk-informed guidance? Why can't we do that?

MR. WOLFGANG: I think the thing is we haven't seen licensee's risk tools, their model that we would have to approve prior to them using any risk analysis.

MR. KLEIN: Let me take a shot at answering the question maybe at a higher level. And that is with respect to licensees who are required to meet the requirements of Appendix R. Don't today have the ability to change that regulation or the

commitment to that regulation based upon risk information.

If they want to do that, they would have to seek an exemption request from us against the regulation. They may certain use risk information if they want to come in and see us with an exemption request, that is certainly open to them.

But what I think Bob is indicating is that a licensee may not make a change in their plant using risk information and making the conclusion based upon their standard license condition that says that, you know, it doesn't effect their ability to achieve and maintain safe shutdown.

The staff has been telling licensees that we would like them to come in and see us for such an exemption request or a license amendment.

MEMBER DENNING: Yes, I understand that that is the way -- that is the process by which they would use risk information to do that. But this first bullet is generic. It is generic information as to how many combinations of things or what are kinds of situations that are -- could be expected to be risk significant?

Now I realize it is not totally complete but it, you know, it gave guidance to the inspectors

as to what are the combinations of things that could risk significant to look at and make sure. And I don't see any reason why one couldn't effectively rule out some of this total space of situations that the applicant has to look at to be compliant.

Now, you know, Tom is saying -- and I think it is kind of the regulatory position that you've got to look at everything because anything that can prevent this safe shutdown pathway is a potential problem. But you used it for the inspector to give him guidance on what is risk important and not in the area.

Couldn't you have done the same to provide generic guidance on this is how far you have to go in this process of looking at multiple spurious actuations.

MR. FRUMKIN: Bob, let me -- I'll be candid. We tried very hard to read 3(g)(ii) as a -- to be risk informed in the way you describe. And with help from our lawyers, we were unable to get there for those pre-`79 plants. And then there is also the Agency or the Commission has approved a risk-informed rule.

And although it is more comprehensive, that is out there. And we considered the possibility

of a risk-informed changed to this rule, to the current 3(g)(ii), and there is currently a rule that has been promulgated by the Commission. So that did not seem like a credible approach.

CHAIRMAN WALLIS: Well, could I follow up on that? And I looked at this risk informed approach. It seems to be just advice on vendors --

MR. FRUMKIN: Yes?

CHAIRMAN WALLIS: -- to focus on certain configurations. Well, that's okay. Focus on what matters. But then how does this inspector decide to reach some sort of a finding that something is not adequate? Or is not in compliance. That would get closer to tying these things together because the whole question here is what do they have to do in order to be in compliance.

MR. FRUMKIN: That is correct.

CHAIRMAN WALLIS: And how does the inspector know when they are in compliance or not? Well, he has just chose to focus on these things. How does he then decide when he is focused whether or not they are in compliance?

MR. FRUMKIN: And the answer to that is they pull up the licensing basis and if the licensing basis, if they do not have -- are not licensed for

single spurious, that are considered to be -- required to look for multiple spurious.

CHAIRMAN WALLIS: Well then what are they supposed to do?

MR. FRUMKIN: Then that would be -- that could be -- that would be a finding would be run through the risk analysis of this STP. It would be cited. And the licensee would have to resolve a finding in the normal manner.

MEMBER DENNING: Incidentally, I think your last statement about their legal interpretation of pre-`79 is very important as far as our considerations are concerned because I mean it could be indeed that we are in a box in terms of whether you can risk inform the current regulation or whether you would need to change a rule which is obviously a huge undertaking.

CHAIRMAN WALLIS: Well, I'm really wondering, you made an initial statement that we should have had a subcommittee meeting. We seem to be at the level of behaving like a subcommittee so trying to determine whether or not you are ready to go to the full Committee because there seems to be so many questions here. And yet we are here as a full Committee.

MEMBER DENNING: That is why we have three whole hours.

CHAIRMAN WALLIS: You know subcommittees sometimes have the option of saying you guys aren't ready. You shouldn't go to the full Committee. But they are here.

MEMBER DENNING: The full Committee has that same option, doesn't it?

MR. WOLFGANG: To continue, in 2004, staff held a public meeting in Atlanta to discuss the staff positions and solicit stakeholder feedback. We worked with NEI to finalize an acceptable industry guidance document for circuit analysis. And that was NEI 0001.

Staff issued RIS 2005-30 to clarify regulatory requirements for a circuit analysis. And that RIS addressed the terms associated circuits, any and all, and emergency control stations.

And this draft generic letter was issued for public comment in October 2005. We held a public meeting in March of this year. And the pertinent public comments were incorporated into the final craft of the generic letter. And we also received CRGR approval to issue the generic letter.

The basis for the generic letter -- the bulleted review of NRC regulations, generic

communications, correspondence related to this issue. And we have references identified in the generic letter. The results of the 2001 NEI EPRI cable fire test program, prior to the cable fire test, there was very little information available regarding circuit failure during a fire which made enforcement of the regulations in this area difficult. And also input from inspectors on issues that needed to be addressed.

The issue clarified in the generic letter is multiple spurious actuations. As Dan said earlier, some licensees claim that only a single spurious actuation had to be assumed in their circuit analysis. This was based on a misinterpretation of Generic Letter 86-10 in response to question 5.3.10.

And also some licensees claimed multiple spurious actuation occur with sufficient time in between them to take mitigating actions.

CHAIRMAN WALLIS: Now this misinterpretation has been going on for how long? D.L. 86 is 9/86?

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Over 20 years they have been under some misapprehension about the regulations?

MR. WOLFGANG: That is my understanding.

MR. FRUMKIN: In this section of the

generic letter, it refers to the 3(g)(iii) associated circuits I believe. So it took 3(g)(iii) alternate shutdown -- I'm sorry -- it took this 3(g)(iii) assumption and applied it to 3(g)(ii) areas. And that is what this misinterpretation is describing.

MEMBER APOSTOLAKIS: Let me understand it a little bit the second bullet here. Suppose there is sufficient time between actuations? Okay, so you have the first one. You really don't know what the second one is going to be, right? It could be anything.

MR. WOLFGANG: Second.

MEMBER APOSTOLAKIS: Oh, let's say there are two --

MR. WOLFGANG: Actuations?

MEMBER APOSTOLAKIS: -- spurious -- yes.

MR. WOLFGANG: Yes, based on these tests, they could occur --

MEMBER APOSTOLAKIS: No, I understand that, that it is a very short time.

MR. WOLFGANG: Right.

MEMBER APOSTOLAKIS: But let's assume for a moment that there is sufficient time, there is long time between them.

MEMBER DENNING: And there may be, George. There is a contention that --

MEMBER APOSTOLAKIS: Okay.

MEMBER DENNING: Yes, right.

MEMBER APOSTOLAKIS: But you still don't know what the second one is going to be.

MEMBER DENNING: Is going to be, right.

MEMBER APOSTOLAKIS: So you can really take mitigations actions without know what the second will be?

MEMBER DENNING: Well, now wait a second. If you have mitigated the first one --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- then it is as if you now just have one.

MEMBER APOSTOLAKIS: Oh, so now you are going to get together and wait.

MR. WOLFGANG: And when the second one occurs and you have time to mitigate that one.

MEMBER APOSTOLAKIS: And this is doable? I mean has anybody looked into the details of this? It comes back to this issue of open endedness. You really don't know what is going to happen next. So I don't understand this particular -- I mean have they submitted details, you know, if you have sufficient time, you will protect the plant?

MEMBER DENNING: You know what I think

would help us is we had some better feeling as to how do they really mitigate these actuations?

MEMBER APOSTOLAKIS: Yes, exactly, exactly.

MEMBER DENNING: What is a typical -- and I know there are constraints on manual --

MR. WOLFGANG: Yes, in 3(g)(ii), they can't use manual actions.

MR. KLEIN: Licensees have commonly used operator manual actions to mitigate that spurious actuation. They may send an operator out in a plant to close a value or some such action like that. And then they wait for the next actuation and they say, okay, I've got plenty of time available to have taken that first action. And now they wait for the second action. And when that occurs, they send the operator out.

So I think that second bullet there is to just simply indicate to the Committee that that is the claim that some licensees have made. That is not necessarily a position that the staff agrees with.

MEMBER APOSTOLAKIS: No, I understand that.

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: But I'm trying to

understand the position.

MEMBER DENNING: Now suppose you had -- suppose it takes 30 minutes to have them get out there and close the valve, now obviously -- more than, you know, and then something else happens say before he closes that valve, then the real question is there a compounding effect?

MR. WOLFGANG: And I guess like --

MEMBER DENNING: As far as you don't have enough operators that you can send out to do all these --

MEMBER APOSTOLAKIS: The real question is is the length of time the critical variable here. And it doesn't seem to me to be.

MR. FRUMKIN: I mean we'll give you an example, for example if you have a -- you going to drain two valves in series that would drain the RWST and you also damage a number of other equipment. They fail. They short out and become unavailable.

Well, if you have -- if you lose the indication on the RWST and you open up the value and you say you have plenty of time to -- you have indication the value opened spuriously, you can go down and close the valve and then when the next valve opens, it has no effect.

I think that would be an example of where they feel they would have sufficient time. Let's say the circuits are in cable trays -- you know, 20, you know, six cable trays above. There is going to be a good deal of time before the first cable tray is damaged and the next -- the first cable is damaged and then the next cable.

So -- and from a risk standpoint, you might be able to argue yes, we will have adequate indication that the valve opened and we have adequate time. And then that could be a risk-informed type analysis.

But if they are in the same cable, then they both could open simultaneously.

MEMBER MAYNARD: If there is time and there are a number of things they can do, when you have a fire in an area, you typically know what cables and what other things could be potentially effected in that and the manual actions going out either manually isolating valves, pulling breakers, a number of things you can do. But it is based on what is in that area or what could be effected with those in that area.

MEMBER APOSTOLAKIS: I remember when I was reading the analysis of the Browns Ferry fire a long time ago. They did have spurious actuations there did

they not?

MR. WOLFGANG: Yes.

MEMBER APOSTOLAKIS: Within 20 minutes I believe they had all sorts of signals and so on. And then things started going dead. How does that experience fit into this?

MR. FRUMKIN: I think that experience is "the long-held staff position" that multiple simultaneous spurious actuations occur. I think when you want to point your finger to where we come up with that, it comes from 1975. It comes from the very beginning of fire protection regulation is that these spurious actuations occur.

And I think that -- unfortunately the statements of consideration for Appendix R are short. You know we have, you know, dozens of pages for a short NFPA-805 and there may be a dozen pages and a page maximum for 3(g)(iii) -- for 3(g) of Appendix R. So we really can't go back in time and pull out the basis for that. But we have Mark Sallies here, he might be able to shed some light on that.

But I believe that that is the long-held staff position is the Appendix R fire and these multiple spurious and rapid succession starting pumps giving incorrect indication, doing all sorts of

unpleasant things to the plant.

CHAIRMAN WALLIS: The incorrect indication is a big problem. Something has happened and yet you don't know quite what has happened. That is another variable altogether from the time. I mean it is the uncertainty of knowing what is going on which might lead the operator to do the wrong thing.

MEMBER-AT-LARGE SIEBER: Yes, on the other hand, indications usually either go full scale or to zero.

MEMBER MAYNARD: A lot of times you've got multiple indications. And that is something they are trained on quite a bit is on instrument failures. That said, it is not uncommon to have an instrument failure without a fire. So they are trained on how to handle that.

MR. FRUMKIN: Right. One of the failure though they can also get -- and, again, there's multiple indications, but they could get an indication of a pump starting when it didn't start. Or a pump in a start and stop position and then that's going to take time for them to troubleshoot and whether it was started or stopped could it be adversely effecting overfilling the plant or not.

There are a number of timing issues that

I'm sure they are trained on. But they can be potentially challenging.

MEMBER DENNING: Continue.

MR. WOLFGANG: The NRC letter from Sam Collins to NEI in 1997 stated that multiple spurious actuations caused by fire-induced hot shorts must be considered and evaluated. As I stated earlier, Byron and Braidwood have SCRs approving the assumption of a single spurious actuation for a fire event. So if the staff position is applied to them, it would be considered compliance backfit.

The generic letter --

MEMBER-AT-LARGE SIEBER: That's a unique case, those two plants.

MR. WOLFGANG: Yes, correct. The generic --

MEMBER APOSTOLAKIS: But what does that mean now?

MR. WOLFGANG: They are in compliance by definition.

MEMBER APOSTOLAKIS: You would say the SCR was not correct or what?

MR. WOLFGANG: They are in compliance by definition, right.

MEMBER APOSTOLAKIS: But I don't

understand this compliance backfit.

CHAIRMAN WALLIS: Compliance by mistake is what I heard earlier.

MR. WOLFGANG: Well, by regulatory approval.

MEMBER APOSTOLAKIS: Can you explain the parenthesis? If stop position is applied to them, it would be a compliance backfit. You mean the current position?

MR. WOLFGANG: If they comply with their SER, the SER is approved even though it was a mistake, it would be a compliance backfit if we made them change.

MEMBER APOSTOLAKIS: So you would have to admit then that the SER was not correct?

MR. WOLFGANG: We have already admitted that.

MEMBER APOSTOLAKIS: Okay.

MEMBER MAYNARD: It is a matter of what regulatory process is used to actually do it. A lot fo people think backfit is a bad thing. I think it is a process that should be used a little bit more rather than trying to go around a lot of these things. Just say hey look, we've changed or this is a new requirement. Here's the regulatory burden. Here is

the increased safety benefit. We are imposing this as the new requirement for you. It's not necessarily a bad thing. Just what regulatory burden --

MEMBER APOSTOLAKIS: But this doesn't happen too often, right? I mean --

MEMBER DENNING: What? Regulatory mistakes?

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: Right.

CHAIRMAN WALLIS: Well, this last bullet, I have a lot of problem with. And they must be considered and evaluated. But it seemed to be very unclear about to what depth and by what methods these things must be considered and evaluated. That seems to be so open-ended that the licensee must be uncertain what he has to do.

MEMBER DENNING: RIS provides more detail than the generic letter does, right. The 2005 RIS.

MR. WOLFGANG: 2005-30?

MEMBER DENNING: Yes.

MR. WOLFGANG: Not on multiple spurious actuations, no.

MEMBER DENNING: No?

MR. WOLFGANG: It doesn't address that. We didn't put that in there because we thought

multiple spurious actuations because of this Byron and Braidwood SCR could be considered possibly a change in staff position. So that's why we didn't want to put it in a RIS.

CHAIRMAN WALLIS: There is no regulatory guide that says how to evaluate multiple spurious actuations?

MR. KLEIN: I think if I could respond to that question, I'll ask Dan also to pipe in. Is on page 7 of the generic letter where we do talk about, you know, ways that licensees can bring themselves into compliance, there is a discussion in there about the deterministic methodology or NEI-0001.

We do talk about the guidance in there in Chapter 3. We do say that for post-fire safe-shutdown circuits in conjunction with the guidance provided in this generic letter that NEI-0001 is one of the acceptable approaches to achieve regulatory compliance with the fire protection requirements for multiple spurious actuations.

So that's one example. And Dan can correct me if I've overstated this.

MR. WOLFGANG: And we say in conjunction with the guidance provided in this generic letter to mean consider multiple spurious actuation. I believe

NEI-0001 says to consider two spurious actuations.

CHAIRMAN WALLIS: That doesn't mean anything to me. It could simply mean to say well I considered it and I think it is irrelevant or something. I mean what does consider mean? But what depth? By what methods?

MEMBER APOSTOLAKIS: To the depth required to convince the staff.

MEMBER BONACA: That is called open ended. We could fix it here but it seems to me that, you know, we do have a problem. And we are trying to figure out what is the best regulatory process to solve it. But the problem is there.

CHAIRMAN WALLIS: Well, I think we agree there is a problem. It is just whether or not there is a mature enough process in place to make something that is workable happen.

MEMBER BONACA: I understand.

MEMBER-AT-LARGE SIEBER: Well, this work has already been done once. The only thing that changed is the disqualification of certain fire barriers. All the licensees have done this. And it should be part of their licensing basis. There should be plant records as to how they did it the first time.

MEMBER DENNING: Really, Jack? I mean

isn't there an issue here of the number of licensees who thought that they were really dealing with one spurious actuation requirement? Or one at a time?

MEMBER-AT-LARGE SIEBER: I can only speak to one licensee or about one licensee. And that was not the assumption.

MEMBER DENNING: That was not your assumption.

MEMBER-AT-LARGE SIEBER: No.

MEMBER DENNING: No. But there are licensees out there --

MEMBER-AT-LARGE SIEBER: Otto, was that yours? It is sort of obvious from Browns Ferry that you get more than one.

MEMBER MAYNARD: I'm trying to recall because the only place where we had different trains mixing was in the control room so it was primarily a control room-related issue.

MEMBER KRESS: But that is one purpose of the generic letter to find out the status.

MEMBER-AT-LARGE SIEBER: The only time the number of faults becomes an issue is when you are trying to solve the problem with operator manual actions. So now you've got too many things for too few people to do.

But if you have train separation and the train separation is effective, you are going to get some spurious actuations which are going to be upsetting but not fatal. And you are still going to maintain a full set of safety equipment that functions. And that is the object of the fire protection regulation.

MR. KLEIN: I would strongly agree with what Dr. Sieber just indicated in that the focus here is on 3(g)(ii) compliance and that is where you've got the redundant trains in the same fire area as Dan had indicated. And Dan had indicated some of the history that, you know, led us up to this.

And that had to do with the resolution that some licensees used to address the thermal lag issue where they removed some of these fire barriers and in lieu of meeting the separation requirements of 3(g)(ii), elected to put in place the use of operator manual actions.

And I think that is a very important thing to kind of keep in mind.

MEMBER-AT-LARGE SIEBER: But other licensees pulled no cable.

MR. KLEIN: That is correct. I'm not --

MEMBER-AT-LARGE SIEBER: They moved

circuits out of the same fire area.

MR. KLEIN: Yes, I'm not suggesting that all licensees implemented unapproved operator manual actions in lieu of the requirements of 3(g)(ii). There are other licensees who did plant modifications, did re-analysis, did re-wraps, pulled cables, what have you to bring themselves back into compliance with 3(g)(ii).

MEMBER-AT-LARGE SIEBER: And some of them didn't use thermal lag to begin with.

MR. KLEIN: That is correct.

CHAIRMAN WALLIS: Well, I don't really have a good understanding of what kind of spurious actions we are talking about, what kind of operator actions in response we're talking about, and whether redundant trains solve the spurious action problem.

If I have a fire scenario and it switches on my high pressure injection, I've got a pump that runs and it is pouring water into the system, right? For one thing, I have to know -- I have to diagnose what is happening. Do I have to send somebody somewhere to shut a valve? And does that factor have some redundant train help me at all when something has been activated spuriously? I mean it is not clear to me what the range of kind of scenarios is that you are

talking about here.

And whether redundant trains always help you or don't. Maybe they don't help you at all sometimes. And maybe the operator action sometimes is so severe that it is very difficult to take.

MEMBER MAYNARD: I think in most cases, there are things they can do. But there are some -- and I think the power operator relief valve is one that if you have a system where you can't operate the block valve or the PRE, if it opens you basically have given yourself a small break.

CHAIRMAN WALLIS: That's what I think. When you think about TMR, they had a false indication because there was a light which said it was closed when it was open.

MEMBER MAYNARD: But most times you are still covered by -- I mean you are still analyzed for a small break LOCA or for the other events. A pump coming on, there are multiple ways to turn pumps off. And you are not going to be injecting water at such a rate that you have, you know -- I'm kind of talking more PWR than I am BWN here so I --

MEMBER DENNING: But it is those things though -- it is the multiplicity of those things that boggles my mind. You know rather than train

separation and train protection which you talked about, it just seems like there is such a multiplicity of potential things and trying to analyze all those things seems almost open ended.

MEMBER-AT-LARGE SIEBER: There aren't -- in sheer numbers, there aren't all that many safety circuits. And if you go underneath the control room into the faucet rafter, you'll find loads of jumpers and knife switches and things like that where you can de-energize control circuits.

Now one of the problems is that it actually, in a lot of circuit breakers, it takes power to trip it, you know. The trip coil requires energization so pulling a knife switch doesn't guarantee that it will run forever. And so the operator really has to understand how the control system is set up to be able to do that.

But there are ways to overcome these problems that don't require excursions all over the plant. And on the other hand, the plant is designed to be safe provided that you have a functional safety train. Separation criteria, if rigidly applied, provides that independent safety train.

MEMBER DENNING: We are going to now take our break until 20 after 10. And then we will have to

move surprisingly quickly after that.

CHAIRMAN WALLIS: Okay. So we're going to take a break until 20 past 10.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:23 a.m.)

CHAIRMAN WALLIS: Rich, would you resume the management of the meeting, please?

MEMBER DENNING: Please proceed.

MR. WOLFGANG: Okay. The last issue, clarifying the generic letter, the point we have here is the staff position on multiple spurious actuations presented in the generic letter is consistent with section 9.5.1 of the standard review plan.

Public comments. The significant public comment was that the generic letter constituted a backfit to licensees. And we addressed this comment. We obtained CRGR approval to issue this generic letter. And, as I said earlier, only for Byron and Braidwood, who have approved SERs that we know of, would this constitute a backfit.

Basically, this generic letter is just a request for information.

MEMBER MAYNARD: I would challenge that.

MR. WOLFGANG: Yes. I think --

MEMBER MAYNARD: That's all right. We'll comment on that.

CHAIRMAN WALLIS: It isn't just a request for information. It asks them to do a lot of things.

MEMBER MAYNARD: Yes. That is what I challenge, that statement. Yes. We've talked about it.

CHAIRMAN WALLIS: That was what I was uncertain about.

MEMBER DENNING: Why don't you go ahead and summarize, even though we're going to have a couple of other things? Why don't you go ahead and summarize? Then there are a couple of other things we would like you to -- we have more than started. We're almost done.

MR. WOLFGANG: A summary. The generic letter, as I said before, is a request for information from licensees. The industry cable fire test program reaffirmed the staff interpretation of the regulatory requirements concerning multiple spurious actuations must be considered in the circuits analysis. The generic letter is necessary to ensure that all risk-significant circuit situations are identified and addressed.

CHAIRMAN WALLIS: Could you go back a bit

and say something about why this came about? I mean, wasn't this something to do with this thermal lag business? All of these installations, like Hemmicks and Eastern, every time we look at them --

MR. WOLFGANG: Yes.

CHAIRMAN WALLIS: Well, isn't that the solution would be to have a proper barrier around these things?

MR. WOLFGANG: That's one solution, yes.

MEMBER DENNING: I don't see that as a total solution. I don't --

MR. WOLFGANG: That is one solution. Another solution is a separation, 20-foot separation.

CHAIRMAN WALLIS: But in the past, when we believed that this thermal lag worked, there wasn't a problem. Is that right?

MEMBER MAYNARD: No. I think the problem was still there then. This has been bounced around since I know at least the early '80s as an issue. I think the thermal lag, it helped in some cases where you could show separation in the trains, but it doesn't necessarily take care of you if you've got cables in the same area that are --

MEMBER DENNING: Right. They can still give you spurious actuation, regardless.

MEMBER MAYNARD: Right.

MEMBER DENNING: Now, it may be -- do you have any comments on that?

MR. FRUMKIN: Yes. If you have the separation, you can still get spurious actuations. And that's a box that we're not in with the rule. The rule does not require that those be protected. So all plants have the flexibility for the unprotected train to mitigate through feasible and reliable manual actions those types of spurious actuations.

Now, if you were to get a spurious actuation that were to give you all incorrect indication and was not recoverable, then that would still have to be resolved because it would be a potential safety issue. But for the minor ones that we have been talking about that would be fairly easy to resolve through a manual operator action or there are procedural controls or something of that nature, that would not be a compliance issue per se.

MEMBER DENNING: Help me with that because I still don't quite understand it. So if you have a protected train and you get a spurious actuation from an unprotected train, then you have to analyze all combinations of spurious actuations still, don't you, that are possible in that unprotected train?

MR. FRUMKIN: Alex, do you want to?

MR. KLEIN: Yes, I believe you do because the over-arching requirement of appendix R is to be able to safely bring your plant to safe shutdown. And if you don't know what's occurring in your plant, then you can't meet that over-arching high-level goal of achieving and maintaining safe shutdown of your plant.

MR. FRUMKIN: And I will just say that once you have your protective train, your protected train, your unprotected train has a very limited set of things that could hurt you.

Now, we're talking we have plenty of water. We have plenty of indication. We have plenty of everything. But now we might open, we might cause a drain letdown path to open or we might cause a pump to start, but we should be getting clear indication of that in the control room. And in the normal procedure, process, you'll be getting indication of these things happening. And they should be able to mitigate them fairly effectively.

Now, there may be some things that would be difficult to mitigate. And, as Alex says, they have to find those and find a way to mitigate them.

MEMBER DENNING: So you have lots of things you have to analyze, but the mitigation of it

is probably not too severe for the plant, and the plant is allowed to do manual action on it.

Now, there is another set here. So what is the other set? Aren't you always required to have a protected train?

MR. FRUMKIN: Yes. And these plants don't have that protected train. In effect, all circuit and manual action findings or potential violations are lack of protection, lack of circuit protection.

MEMBER DENNING: Circuit separation.

MR. FRUMKIN: So when --

MEMBER DENNING: Separation of the --

MR. FRUMKIN: Right. So when a finding comes in, let's say we have that hypothetical finding, which opens up and drains down the RWST. The citation is going to be against 3G2, lack of separation and lack of protection.

Now, we don't require one protection method over another, but they didn't put a protection method in there to protect the -- well, RWST is a bad example because it is not a necessarily one-train system.

But let's say you have both trains being affected by a fire. And here this is probably what is the more likely scenario. One train is just going to

be damaged by the fire and not work, and then the other train is going to have the spurious actuation.

We don't necessarily need both trains to have spurious actuations. So that's the situation. It doesn't have to be multiple spurious on multiple trains.

MEMBER APOSTOLAKIS: Have we agreed that the first bullet is not quite correct? We're asking for more than just information?

MR. FRUMKIN: It's clear.

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: It just takes them a lot of work to do it. I think we all recognize that it's a request for information, but in order to produce that information, you have to do a lot of work.

MEMBER APOSTOLAKIS: Right. It sounds to me like the priest saying, you know, "I know you're a sinner, George. Now, you go away and think of all the ways in which you could be a sinner and come back and tell me what they are." I have thought about it.

CHAIRMAN WALLIS: It's already been analyzed.

MEMBER APOSTOLAKIS: I protected myself.

MEMBER DENNING: Let's go on. And I would like to hear the conservative risk analysis. And so

would you give us a little presentation on the conservative risk analysis?

MR. FRUMKIN: Are you done with all of your slides?

MEMBER DENNING: Yes.

MR. WOLFGANG: Yes. I just want to say one thing. If we don't issue a generic letter, we'll have to use the inspection process behind these problems.

It will take longer. We estimate three triennials, nine years. And some risk-significant items may be missed. We don't know because the burden is put on us, instead of the licensee. I just want to bring it up.

MEMBER DENNING: Thank you.

MEMBER BONACA: Is it with regard to the 90 days with the responses? I mean, how did you come up with the 90 days, recognizing that you have to go to award to provide these responses? Was there an evaluation that you performed?

MR. WOLFGANG: No.

MEMBER BONACA: I mean, can it be changed?

MR. WOLFGANG: It can be changed. It was an arbitrary period that we thought was --

MEMBER APOSTOLAKIS: Or you can reduce the

requirement.

MR. WOLFGANG: Yes, or we can --

MEMBER APOSTOLAKIS: So we don't have these?

MR. FRUMKIN: No, you don't have these slides. We will be making them available.

MR. KLEIN: Just as a reminder, if I can just follow up on the 90-day issue and the comments in regard to that, we do have a bullet in there that, for licensees who can't meet that 90-day requirement, that within the 30 days, they come in and request an extension.

MEMBER MAYNARD: Yes. And I saw that in the generic letter. If it's a situation where you know 90 percent of the industry is not going to be able to do it, you might as well be able to pick a date where everybody is not having to do it. I'll be interested in hearing from the industry as to whether they think that is a burden or not. I think I am assuming it is, but it may not be. So I don't know.

MR. FRUMKIN: This is a bounding risk analysis for multiple spurious actuations. It was developed for this meeting by Ray Gallucci, Dr. Ray Gallucci, who is in the Fire Protection Section. And it's been presented as a paper for the American

Nuclear Society presentation. I think this winter they're having a meeting.

I am the third string presenter of this document. Ray is the first string. Dr. Weerakkody is the second string. And I'm presenting out of necessity.

MEMBER DENNING: Is Ray here to get beaten upon if he --

MR. FRUMKIN: No. Ray is on inspection at Browns Ferry. So we have --

MEMBER APOSTOLAKIS: Last time he was here he --

MEMBER DENNING: No wonder he's at Browns Ferry.

MR. KLEIN: Let me clarify. He's on a program review at Browns Ferry. He's not on an inspection.

MR. FRUMKIN: Okay. I'm sorry. These slides will be made available. My understanding of this analysis is using an older plant PRA that Ray was involved in, he pulled out some of the important measures for some hot shorts. And he recombined them into multiple hot shots and, using a simplification process, determined a bounding risk analysis for those based on those important measures for one plant's PSA.

So this is the typical older nuclear power plant, has a fire CDF of 3.3^{-5}. And they used a hot short probability of .1. They had modeled 24 of the basic events. And that contributed about 5 percent to the fire CDF or $1.8D^{-6}$.

And then there were some systematically symmetric redundant train components that were chosen because I think they had more of a larger impact on the plant risk if they were to fail together. And that was a contribution of .03 to the fire CDF, those 10 items.

MEMBER DENNING: Let's go slowly so we --

MEMBER APOSTOLAKIS: Yes.

MEMBER DENNING: -- understand what we have here.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: Twenty-four hot short basic events above truncation. What does that mean?

MR. FRUMKIN: That in the model, the ones that had remained as important remained having importance measures in the model, that there were only 24 hot shorts that remained there.

MEMBER APOSTOLAKIS: The core damage frequency due to hot shorts is $1.8\ 10^{-6}$ per year, it says.

MR. FRUMKIN: Correct, assuming a hot short probability of .1.

MEMBER APOSTOLAKIS: Which was low.

MR. FRUMKIN: Which is low based on current data.

MEMBER KRESS: Okay. So one, it would be 1.8 times 10^{-5}.

MR. FRUMKIN: If you said 1.0, correct.

MEMBER DENNING: Now, you said that that's low, but don't forget here that now we're talking supposedly real nuclear power plants with fires where you would take into account the fact that the fire may not damage any cables, you know.

MR. FRUMKIN: Right. Well, this is from an --

MEMBER DENNING: Oh, this is --

MR. FRUMKIN: -- old fire PSA. So this does consider --

MEMBER DENNING: Yes, it does.

MR. FRUMKIN: -- many of those factors.

MEMBER DENNING: But saying that the probability of your hot short is .1 and saying, "Well, that is low," I think because we saw those other things where people say, "Well, it could be .6 or .2 or something like that," --

MR. FRUMKIN: Right.

MEMBER DENNING: -- and, therefore, this is low, that doesn't necessarily follow.

MR. FRUMKIN: I think this is the conditional hot short probability based on cable damage.

CHAIRMAN WALLIS: How about multiple shorts come into this?

MR. FRUMKIN: That is what we are going to be talking about.

CHAIRMAN WALLIS: This doesn't address that?

MR. FRUMKIN: No, no. Right. This is what this analysis is. So assuming that the components within each pair -- these are those ten items that have been paired -- have similar failure characteristics and locations, including their cable runs, again, this is a conservative assumption and that these comprise the full set of candidates for multiple spurious actuations that are not specifically modeled in the traditional IPEEEs as --

MEMBER APOSTOLAKIS: The number you showed us earlier assumes that these happen independently?

MR. FRUMKIN: Yes.

MEMBER DENNING: You know, I still don't

understand the pairing. What is going on here? Is it ten corresponding to --

MEMBER APOSTOLAKIS: Ten of these?

MEMBER DENNING: Five paired components. That means that there is a --

MEMBER APOSTOLAKIS: Redundant elements.

MEMBER DENNING: They're redundant elements.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: I believe what they did is of these 24, they took out 10 of them that could when combined have an issue.

MEMBER APOSTOLAKIS: They are still located in the --

MEMBER DENNING: It could lead to problems.

MR. FRUMKIN: On this slide, they're independent.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: But I think what we're going to do is we're going to try to take out that and look at them as pairs. So this is what we're going to do, form a bounding analysis to estimate the potential maximum CDF due to multiple spurious actuations for this typical older MPP, which I think is what the

target, the goal is here.

And now we start getting into some formulas. Per pair, one hot short corresponds to train A and the other to train B. So that's how they were paired. And they appear in symmetrically paired cut sets.

So one cut set, the CDF of A -- and there's the formula for that -- and the CDF of B, which is the fire initiator, and then the hot short or random failure of one of the paired components and then the summation of the B. Okay?

CHAIRMAN WALLIS: And where do the multiple shorts come in?

MR. FRUMKIN: This is the formula for --

CHAIRMAN WALLIS: It's between two trains, but it's not multiple shorts in the same cable.

MR. FRUMKIN: That's correct, not in the same cable.

CHAIRMAN WALLIS: It's still independent. And this formula that you have here, the cut sets, are still assuming that the --

MR. FRUMKIN: I think so. They're not going to be independent of the same fire and the same damage time, but they're going to be independent failures affected by the same fire.

MEMBER APOSTOLAKIS: Conditional on the fire.

MR. FRUMKIN: Conditional on the fire.

MEMBER SIEBER: Which assumes the fire covers both things.

MR. FRUMKIN: Right, which is a conservative assumption in this analysis.

MEMBER SIEBER: Truly conservative.

MR. FRUMKIN: Yes.

MEMBER SIEBER: Improbable.

MR. FRUMKIN: Well, it depends on the design of the plant, but yes, it's --

MEMBER APOSTOLAKIS: So if I want to couple them, then, I will assume that Fa and Fb are just F, one fire. Is that correct? And then I will have --

MEMBER DENNING: A is --

MEMBER APOSTOLAKIS: Otherwise they are still independent. I mean, the fire initiator must be the same.

MR. FRUMKIN: Well, let's just hope that your answer --

MEMBER APOSTOLAKIS: We assume two different fires.

MEMBER DENNING: We'll go to the next

slide. And maybe it will become clear.

MEMBER SIEBER: It's a lot clearer in here.

MR. FRUMKIN: Okay. So, again, we have --

MEMBER APOSTOLAKIS: This .1 comes from?

MR. FRUMKIN: The .1 was the state-of-the-art when they did this PSA of --

MEMBER APOSTOLAKIS: I'll tell you where it comes from.

MR. FRUMKIN: Okay.

MEMBER APOSTOLAKIS: That's 20 years or so ago.

MEMBER DENNING: You're responsible for .1?

MEMBER APOSTOLAKIS: I saw it, and I said, "Well, gee. How did you come up with that?"

So they said, "Well, call this guy" somewhere in California.

I called this guy. He says, "Well, you know Sandia told us that."

"What Sandia?"

"This person."

So I called this person in Sandia. He says, "Well, I really don't know. It's this other guy."

So I called this other guy. And he says, "You told us that."

(Laughter.)

MEMBER DENNING: So we're going to accept the .1.

MEMBER APOSTOLAKIS: It wasn't followed up at all. I mean, that was the funniest thing.

MR. FRUMKIN: The IPEEE assumed this hot short probability of .1. And then I believe we're doing a simplification of these factors here. And it actually gets very simple on the next slide, but if anyone really wants me to read through this, I can try.

MEMBER DENNING: You know what we'll do? Let's go to the bottom line.

MR. FRUMKIN: The bottom line.

MEMBER DENNING: And we'll have copies of this.

MR. FRUMKIN: Okay. Yes.

MEMBER DENNING: And we'll --

MR. FRUMKIN: Okay. This is, I believe -- well, let's see.

MEMBER APOSTOLAKIS: No. This is --

MR. FRUMKIN: This is the bottom line here.

MEMBER APOSTOLAKIS: Go back a little bit.

MR. FRUMKIN: I think --

MEMBER APOSTOLAKIS: This Fa plus Fb I don't understand. I thought it was going to be 1.5.

CHAIRMAN WALLIS: That's two fires, isn't it?

MEMBER APOSTOLAKIS: This is one or the other, yes, one or the other.

MR. FRUMKIN: Yes.

MEMBER APOSTOLAKIS: It doesn't really -- I mean, he should have assumed one fire as far as I can tell. But, again, the --

MEMBER DENNING: We will look at it carefully.

MEMBER APOSTOLAKIS: -- connection is nothing, I mean, right?

MEMBER DENNING: We will look at it carefully later.

MR. FRUMKIN: Right. That would be a small difference.

MEMBER DENNING: And Ray's bottom line again is?

MR. FRUMKIN: Okay. Well, what he does here is he's taking out the $1.1E^{-6}$. And he's putting in this value or coming up with this value of .011,

which is his surrogate simplification for all of the fires and his X factor, which is his fire and his failure factor.

MEMBER APOSTOLAKIS: He's bounding the random failures, right, by assuming a 10^{-3}, right?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: Yes.

MR. FRUMKIN: Typical, right.

MEMBER APOSTOLAKIS: But he doesn't know how many -- oh, this is a bound on all random failures that are required.

MR. FRUMKIN: Yes.

MEMBER DENNING: Continue. Let's see.

MR. FRUMKIN: Okay. And now he's talking about the dual failures. Any of the ten paired hot shorts would appear in the cut sets. And Fa is the S, which is your severity factor, which going to reduce your likelihood of more hot shorts, which is the likelihood of having a big fire that's going to cause this damage.

CHAIRMAN WALLIS: Which affects both trains?

MR. FRUMKIN: Right. And then your various factors, A hot, B hot short, and then your random factors.

MEMBER APOSTOLAKIS: Why square? Why A hot times A hot? It still assumes that they're independent events, right?

CHAIRMAN WALLIS: Well, that is the A hot times B hot --

MEMBER DENNING: It is going to take us some time to really work through this. Rather than do this here, --

MR. FRUMKIN: Okay.

MEMBER DENNING: -- let's go see Ray's bottom line.

MR. FRUMKIN: Okay. The bottom line is here.

MEMBER APOSTOLAKIS: All right.

MR. FRUMKIN: So for his choice of fires, for severity factor, I think he used a .1 for this extreme fire, which is an S.

CHAIRMAN WALLIS: Why is .1 extreme? It could be .5.

MR. FRUMKIN: Oh, no, no, no. This is for the likelihood of a large fire.

CHAIRMAN WALLIS: Yes. But just asking George Apostolakis by telephone tag --

MR. FRUMKIN: Oh, no. This is not his .1.

CHAIRMAN WALLIS: I thought it was his .1.

MR. FRUMKIN: It's somebody else's .1.

MEMBER APOSTOLAKIS: This is from one of my students.

MR. FRUMKIN: That's right. Right. This .1 is from very likely the fire protection STP, which says that severe fires happen or ten percent of all fires that happen are severe, which is, again, a conservative number based on the state-of-the-art, which is the 6850 analysis.

But that's what we're doing with -- I mean, this is no question about it. This is a bounding analysis.

CHAIRMAN WALLIS: The ones that cause hot shorts?

MR. FRUMKIN: No. Instead of using a severity factor of one, assuming that all fires will cause the damage, we're only assuming that ten percent of the fires will cause the damage to cause hot short. So there are many different ways of severity --

MEMBER APOSTOLAKIS: So this .011, .011, is the frequency of fire or, no, this is from the random failure?

MR. FRUMKIN: Right.

MEMBER APOSTOLAKIS: According to one is one?

MR. FRUMKIN: That's the severity factor.

MEMBER APOSTOLAKIS: What is the frequency of fire?

MR. FRUMKIN: What I believe he has done is I believe he has back-calculated through his simplification that .1 that he used. And he's turned that, the whole -- all of his important measures into this .011.

MEMBER APOSTOLAKIS: So that includes the frequency of fire?

MR. FRUMKIN: I believe so.

MEMBER APOSTOLAKIS: That's a pretty high number.

MR. FRUMKIN: Yes.

MEMBER DENNING: We are going to look at this carefully, but his bottom line is saying, well, what this could do in this particular case is it could have increased by a factor of three the fire damage frequency.

MR. FRUMKIN: I think what he's trying to say here is that when he back-calculates from his importance measures and then he combines these pairs, that -- and this is the bottom line here -- he can have a maximum of IE^{-4} per year due to these pairs of hot shorts.

MEMBER DENNING: And without it, they had 3 times 10^{-5} is what this plant did.

MR. FRUMKIN: Yes. That's the whole fire risk for the plant, is 3 times 10^{-5}. So this could be dominating.

MEMBER APOSTOLAKIS: But why couldn't you go to an actual PRA and fix, instead of whatever they had, and see what happens, rather than doing this undue analysis? I mean, there are detailed fire PRAs out there.

MR. FRUMKIN: We don't actually have one in the office. He did have this information available to him.

MEMBER DENNING: What I would like to do is we would definitely like copies. Don't go anywhere.

MR. FRUMKIN: Okay.

MEMBER DENNING: And I don't think you have to read that. What we would like -- I mean, you can actually --

MR. FRUMKIN: Well, here his last slide is at least for a typical older nuclear power plant, one cannot a priori dismiss multiple hot shorts of being of lower significance.

MEMBER DENNING: Okay.

MEMBER APOSTOLAKIS: Well, I would like to see the paper, please. No, no. Give me a copy.

MEMBER DENNING: Right. Yes, if we may. What we would like to do now is we would like to hear now from NEI, if we could. Don't run away, Research.

MEMBER APOSTOLAKIS: Don't anybody go away.

MEMBER DENNING: Don't anybody leave town other than me, but I would definitely like to make sure we have plenty of time to hear from NEI.

MEMBER APOSTOLAKIS: That's what I call running and meeting with --

MEMBER DENNING: The policeman is asked to lock the doors.

MEMBER APOSTOLAKIS: We have a cop outside?

MEMBER DENNING: And, Alex, you don't have handouts, but we can make them. Is that a true statement?

MR. MARRION: No, I do not have handouts. I do have a couple of comments.

MEMBER DENNING: You have comments?

MR. MARRION: Yes.

MEMBER DENNING: But you don't have any papers?

MR. MARRION: No.

MEMBER DENNING: Okay. Please proceed.

MR. MARRION: Good morning. My name is Alex Marrion. I am a Senior Director of Engineering at NEI, and I appreciate the opportunity to offer a couple of comments on our perspectives on what we heard this morning.

Before I begin, I want to point out that we have two utility representatives, one from Progress Energy and one from Duke Power, who represent the two pilot plants for the application of NFPA 805.

And if the Committee so desires, I think it may be useful for you to understand the implications of this generic letter on the NFPA 805 risk-informed application process. And I'll defer to you to --

MEMBER DENNING: We so desire.

MR. MARRION: Okay. Very good. Now I'll ask them to step up when I finish my comments.

To get back to Dr. Apostolakis' -- George's comment, --

(Laughter.)

MR. MARRION: -- the test protocol and the issue of having cables exposed in the flaming region, I don't have any direct knowledge of that discussion

with the NRC staff at the time we developed the test protocol. This was the first I heard of it, but I'll look into it. And we'll try to get an answer to you at the end of the week.

I do want to make it clear that we believe the multiple spurious actuation is a new regulatory position that results in significant impact on utility licensees, not only on the Appendix R, the NUREG 0800 plants but also on the NFPA 805 plants.

The impact is significant in that it changes the methodologies that the utilities have credited in their licensing basis over the last 20 years. So the licensing basis has to change.

Now, with that, it's perfectly appropriate for the NRC to say, "There's new information that has been brought to bear on this topic. And we have a new position." That's fine. But the NRC must bear the burden of demonstrating the safety impact of that new position and do a regulatory analysis to substantiate it because of the significant implications on the utility licensee design basis.

That's straightforward, but one thing that this position does not take into account is the fundamental elements of defense-in-depth relative to fire protection. What I'm talking about is the

actions that are taken by licensees in preventing fires from occurring and detecting a fire when it does occur, having systems and personnel to respond to the fire to mitigate the consequences of the fire, suppression and detection systems, and then ultimately recovering the plant to assure that you can get into a safe condition.

We understand there is value to looking at risk-informed approaches and changes and assumptions and evaluating them accordingly, but I would recommend that we not lose sight of the defense-in-depth concepts as we go through this process going forward.

This generic letter is another example of what is fundamentally flawed with fire protection regulations and has been a problem with fire protection regulations and the associated regulatory process over the last 25 or 35 years.

And by that, I mean we have a continuous evolution of NRC positions and expectations that are addressed in a somewhat informal manner. And by that, I mean use of generic communications to articulate regulatory positions is, quite frankly, inappropriate.

New regulatory positions should be evaluated in terms of safety impact or clearly demonstrating the compliance issue associated with

that new position. Then that has to be made publicly available so that the licensees can understand what these new positions are and what the basis for the positions are.

Historically in fire protection, it's been a plant-specific fire protection engineer from the licensee to an NRC inspector agreement of what the understanding is relative to an interpretation. And that is the problem that we're trying to fix. That's why we are so firm in our comments going forward, because fundamentally, gentlemen, if we don't address or we don't identify resolution to the spurious actuation issue today, it will be an issue for the NFPA 805 plants.

Going to 805 does not provide a resolution to this issue today because there is no understood methodology that can address the staff's position. I want to make that very clear.

MEMBER APOSTOLAKIS: Is this the open-ended issue that we discussed earlier?

MR. MARRION: Yes, yes. The comments made about CRGR approval of this generic letter, as an external stakeholder, that essentially is meaningless to us, reason being we are not privy to any kind of disciplined process that is used by CRGR or anyone

within the NRC that clearly demonstrates this is the basis for the safety concern or this is the basis for the compliance concern.

What we have seen over the years -- and this is another example -- where the preferred route appears to be, well, let's make it a compliance concern because we as a regulatory agency, the NRC, can interpret the regulations. We have the right to interpret the regulations, et cetera, which is fine, but let's put the interpretation on paper. Let's identify resolution path so we have a common understanding going forward. We don't have that today on this particular issue.

Lastly, I would like to say that there isn't a generic letter that is simply a request for information. It should be clears from the discussion this morning that this generic letter basically imposes a new regulatory requirement that has significant impact on the licensing basis of current plants. That is not a request for information.

Those are the comments that I wanted to make this morning. I don't know if you have any questions on anything I said.

MEMBER DENNING: Yes, we do have some. One of them has to do with the timing, the 90 days,

and the timing required to do the kind of analysis that's being requested there. Do you have a feeling as to what an appropriate time would be?

I mean, there's a timing that says, are you in compliance with this, which, regardless of this question, whether it's a new regulation or an old, there's no question the plant can determine that fairly quickly. But doing the entire analysis and determining what affected SSCs are, do you have any indication from the plants as to how much time that might take and what an appropriate time frame would be for a response like --

MR. MARRION: I don't have the information to answer the question, but I would submit that the next two individuals may be able --

MEMBER DENNING: May be of help on it?

MR. MARRION: -- to give you their perspectives.

MEMBER DENNING: Okay. Good.

MEMBER MAYNARD: Could I just --

MEMBER DENNING: Yes?

MEMBER MAYNARD: Your perspective comment was made that if the generic letter is not issued, then it would just have to be dealt with in inspection space. Do you have any comment on that?

MR. MARRION: It is being dealt with in inspection space. Now, what we don't have is an external stakeholder. When I mention "we," I'm speaking of NEI and the industry. What is the safety case or what is the compliance case? And we haven't seen evidence of that clearly demonstrated that NRC action in this particular area is necessary in an expedited manner.

VICE CHAIRMAN SHACK: Just to address your methodology question, apparently you can deal with multiple actions if they come sequentially. So you have a methodology for that. And you're arguing that there isn't a methodology.

So it isn't necessarily the open-endedness of it that's the problem?

MR. MARRION: There isn't a methodology for addressing all spurious actuations in a given fire. Utilities had --

VICE CHAIRMAN SHACK: You can address them one at a time.

MR. MARRION: You can address them one at a time. And I would ask that the two utility representatives explain their methodology for circuit analysis. I think we would find that very insightful.

MEMBER DENNING: Good.

MR. MARRION: But it's changed. And then what I would like to do is ask Dave Miskiewicz from Progress Energy and Harry Barrett from Duke Power.

CHAIRMAN WALLIS: I would bring up the point before you leave --

MR. MARRION: Yes?

CHAIRMAN WALLIS: You talked about the role of a generic letter and whether it just requests information. We have another generic letter on sumps, which you may be aware of, right?

MR. MARRION: I am generally aware of that one.

CHAIRMAN WALLIS: It not only requested information. It requested analysis, and it requested plans. And, in fact, it's resulted in large changes in the plant by a result of a generic letter.

MR. MARRION: Yes.

CHAIRMAN WALLIS: So it's not as if this is a unique generic letter, which is actually asking plants to do much more than just supply information.

MR. MARRION: My only point is a request for information as this generic letter is characterized as a mischaracterization of what its impact is.

CHAIRMAN WALLIS: Well, it clearly isn't

that. I mean, it says a request for information and taking additional actions. I mean, the sentence asks for more than just information.

MR. MARRION: Okay?

MEMBER DENNING: Okay. Let's have our visitors come up.

MR. FRUMKIN: If I could add? This is Dan Frumkin. Just one point. The inspections started again in January of 2005, but there is still currently enforcement discretion for all circuit findings. And so there may be a perception that this has not turned into an issue yet because of a lack of enforcement in this area.

So starting in September 2006, enforcement will proceed for plants that do not have enforcement discretion under NFPA 805. So I just want to put that out there that currently there are no enforcement actions in this area for plants that take compensatory measures and have correction action plans.

MEMBER DENNING: Introduce yourselves, please.

MR. BARRETT: Good morning. My name is Harry Barrett. I work at Duke Power. I'm the three-site lead for NFPA 805 transition for all three of these sites in Duke Power's nuclear fleets. I just

wanted to say a few words about the multiple spurious issue as it affects 805.

Although 805 is a risk-informed, performance-based rule, it is based on your current licensing basis going forward. And if that is questionable, then your regulatory foundation that you're billing it on would be questionable in 805, which ends up leading to a lot more effort and a lot more analysis required for that.

So this multiple spurious issue is adding a significant amount of paperwork and analysis to 805 transition. The original concept was you would take your fire protection licensing basis, map it over to the 805 requirements, and it was pretty much just a paper transition.

With this new multiple spurious and the complications that that adds to the fire PRA, we're looking at a significant amount of engineering effort that goes into that.

It's going to take us over two years to do the transition for Oconee, which is the first plant. And a lot of that, most of that, is the PRA in the multiple spurious issue.

MEMBER APOSTOLAKIS: Do you agree that it is an issue?

MR. BARRETT: I agree that it needs to be looked at. I have not seen a multiple spurious scenario that is risk-significant yet.

MEMBER APOSTOLAKIS: Do any of your plant have a detailed fire PRA?

MR. BARRETT: We have a fire PRA. We have --

MEMBER APOSTOLAKIS: Not IPEEE, though?

MR. BARRETT: We had an early '80s vintage fire PRA, but we are putting together a NUREG 6850, the new version of it.

MEMBER APOSTOLAKIS: Okay. So --

MR. BARRETT: We're doing that now.

MEMBER APOSTOLAKIS: It would be, then, possible for you to go back to that PRA and see what happens if you assume multiple --

MR. BARRETT: It assumed multiple in the original analysis. To use the core melt, we needed to use multiples for that particular analysis. So it included --

MEMBER APOSTOLAKIS: The number came out okay?

MR. BARRETT: It came out relatively high. I don't remember the exact number, but fire was a fairly significant contributor to risk in the --

MEMBER APOSTOLAKIS: Not fire overall, but, I mean, this particular mode with --

MR. BARRETT: Spurious?

MEMBER APOSTOLAKIS: Yes.

MR. BARRETT: If I remember right, many of the combinations that we analyzed were within the bounds of the Appendix R analysis originally for control room evacuation. The main fire area that we got into trouble with the IPEEE or the fire PRA, the original one, was in our cable shaft going up to the control room, where we had just about every cable in the plant going through one area. And so --

MEMBER APOSTOLAKIS: It seems to me that --

CHAIRMAN WALLIS: Did you assume multiple spurious actuations, simultaneous, and all of this?

MR. BARRETT: In that particular PRA, we ended up having to go to multiple spurious actuations in order to get the core damage.

CHAIRMAN WALLIS: Okay. Including simultaneous actuations.

MEMBER APOSTOLAKIS: So it would be interesting, then, to compare your numbers and analysis with the bounding analysis that the NRC staff has done to see which one makes sense.

I mean, it seems that we do have a body of knowledge there that at least I as a member of this Committee don't seem to have access to. I don't know whether the rest of the members are familiar with it, but I doubt it.

So, I mean, it would be nice to see that, especially since you have done it already, I mean.

MR. BARRETT: Yes. The original analysis was nowhere the rigor that 6850 requires now.

MEMBER APOSTOLAKIS: I understand that. I mean, you --

MEMBER SIEBER: It is just one plant. So it's not clear to me how you can extend that to some --

MEMBER APOSTOLAKIS: Yes. But it provides a basis for judging what Ray Gallucci did.

MEMBER SIEBER: It gives you an idea.

MEMBER APOSTOLAKIS: Yes. And also what kind of effort it takes to do it because under NFPA 805, it seems to me that if you find -- as I recall. Maybe I'm wrong. As I recall, you're right. You're supposed to meet the regulations, but if you don't meet some of them, then you can argue in risk space.

MR. BARRETT: Right.

MEMBER APOSTOLAKIS: Right?

MR. BARRETT: Right.

MEMBER SIEBER: You don't need to.

MEMBER APOSTOLAKIS: But you don't need to go back and comply. So, I mean, there is a way out of it depending on the quality of the risk assessment.

MEMBER SIEBER: That would be a basis for an exemption, but you can't just sit there and do nothing.

MEMBER APOSTOLAKIS: But is that consistent with a statement that it does a lot of work, paperwork? I mean, if you already have the PRA, why does it add a lot of work? But you just said that, right?

I'm sorry. I don't remember your name.

MR. BARRETT: Harry.

MEMBER SIEBER: The PRA is not state-of-the-art.

MR. BARRETT: Right. The original PRA is not state-of-the-art.

MEMBER SIEBER: They have to do the work.

MR. BARRETT: The one that they are doing now is state-of-the-art. They're using 6850 and --

MEMBER APOSTOLAKIS: When do you expect it to be completed?

MR. BARRETT: It should be complete by

probably June of next year.

VICE CHAIRMAN SHACK: When you do your state-of-the-art PRA, you're going to consider multiple actuations, right?

MR. BARRETT: Yes.

MEMBER APOSTOLAKIS: Yes. So, I mean, is it clear to everyone? I mean --

MR. BARRETT: We are taking significant efforts to make sure we get our best chance at finding those multiple spurious risk --

VICE CHAIRMAN SHACK: But it seems to me that anybody doing a fire PRA is going to have to consider multiple --

MEMBER DENNING: Do they have to consider them as comprehensively as here? Because they will have screening criteria. And I guess can you tell me if you weren't -- you know, suppose you were not heading towards that.

If you are sitting there and you had to do this analysis, how long would it take you to do this analysis? And how difficult would it be to -- would you have to modify the plant to be able to accommodate it?

MR. BARRETT: I am not sure about that. What we would probably end up doing is using the

guidance in NEI-0001, chapter 4, which is the risk analysis piece of that, which is, in essence, doing a mini PRA for the --

MEMBER DENNING: But you're not allowed to use that. I mean, by this generic letter, you're only allowed to do that if you're then going to look for exemptions.

MR. BARRETT: Right, yes. You're not doing 805. That's your only other --

MEMBER DENNING: Yes.

MR. BARRETT: I mean, you need to modify the plant or you --

MEMBER DENNING: Modify the plant. How long would it take you to do that analysis in --

MR. BARRETT: Guessing, I would say probably a year.

MEMBER DENNING: Probably a year. I mean, what is in here says 90 days.

MR. BARRETT: No way.

MEMBER DENNING: There's no way?

MR. BARRETT: No way.

MEMBER DENNING: You would think that --

MEMBER SIEBER: Well, you can tell in 90 days roughly how long you think it's going to take you to do it.

MEMBER DENNING: Absolutely.

MEMBER SIEBER: But that's not what they're asking.

MEMBER DENNING: But that's not what they're asking.

MR. BARRETT: I mean, your choices are to take your safe shutdown analysis and just say that everything in a given fire areas fails immediately.

MEMBER SIEBER: That is the way you used to do it.

MR. BARRETT: And you can't do it.

MEMBER SIEBER: No.

MR. BARRETT: I mean, with the acceptance criteria you have in Appendix R, having water level go out of the pressurizer, you can do that with just a couple of spurious actuations. If you do all of them, you're never going to make it. So I don't know how you do that in 90 days.

MR. WOLFGANG: This is Bob Wolfgang with again --

MEMBER DENNING: Go ahead, Bob.

MR. WOLFGANG: The 90 days, what we have currently in the generic letter is for functionality assessment. To submit any exemption requests, amendment requests, that's the six-month period.

MEMBER DENNING: Yes, but what I am missing is to do the functionality assessment, don't you have to do basically the analysis?

MR. BARRETT: Yes. That is essentially an operability assessment. Are components operable? In order to know that, you have to do the analysis to know what gets damaged and when. There's no way you're going to do that in a short time, no way.

MEMBER DENNING: Dave, did you want to make some comments?

MEMBER SIEBER: Before we switch, one thing that you said that I think is important is you really can't get the core damage unless you have multiple spurious actuations.

MR. BARRETT: We have some singles that get us in trouble, and we're going to have to fix those. But as far as getting into the core damage, I'm not even sure --

MEMBER SIEBER: This would be opposing trains, too, right?

MR. BARRETT: Well --

MEMBER SIEBER: Train A, train B pairs.

MR. BARRETT: By the fire PRA methodology, you're really not even worrying about 3G2 or 3G3 anymore. You're looking at fires anywhere and damage

to all of the circuits.

MEMBER SIEBER: Right.

MR. BARRETT: So you're really looking at controlling fires and cable room fires and all of that. And, you know --

MEMBER SIEBER: But if you were to make the assumption that you only have one spurious actuation, you wouldn't get the core damage. And you could just say, "I don't need to do anything," right?

MEMBER APOSTOLAKIS: Well, it depends on what else fails.

MR. BARRETT: Yes. I think it depends largely on --

MEMBER SIEBER: It would be an on-fire --

MR. BARRETT: -- what other failures --

MEMBER SIEBER: -- a non-fire-induced failure, right?

MEMBER DENNING: There has to be a core damage frequency, though. I mean, when you said you wouldn't get core damage frequency with a single failure, you have to because you have other unrelated, but it's just very low.

MR. BARRETT: Also we are talking hot shorts here, but you also have fire-related damage, which takes the component out of service, which is not

included in that spurious operation probability.

So it's a much more complicated things to get your arms around as far as loss of all electrical power, loss of indication, and all of that. It's more than that.

MEMBER DENNING: Yes?

MEMBER SIEBER: Thanks.

MEMBER DENNING: Dave?

MR. WOLFGANG: Excuse me.

MEMBER DENNING: Yes?

MR. WOLFGANG: This is Bob Wolfgang again.

So Duke's response to this generic letter would be we're addressing it. We're transition to NFPA 805. And we're going to address multiple spurious actuations in that transition.

MR. BARRETT: Yes, sir.

MR. WOLFGANG: And that is the total response we're looking for from --

MR. BARRETT: We will give you a schedule of when we think that will be done, yes.

MEMBER DENNING: Okay. If that is what you are asking for, you're going to have to change the generic letter.

MR. BARRETT: No.

MEMBER DENNING: My interpretation. Well,

we'll look at that.

Dave, why don't you go ahead and say a few words?

MR. MISKIEWICZ: Okay. My name is Dave Miskiewicz. I'm from Progress Energy. I'm the lead PRA supporting the transition to 805 at all of our units.

MEMBER APOSTOLAKIS: PRA?

MR. MISKIEWICZ: I'm the lead PRA engineer supporting our transition.

MEMBER APOSTOLAKIS: I thought you said "elite."

(Laughter.)

MR. MISKIEWICZ: That does sound good.

A lot of the discussion I'm hearing, my perspective is probably a little bit different than the normal compliance.

MEMBER APOSTOLAKIS: That's why we want it.

MR. MISKIEWICZ: You know, there is uncertainty. And I am used to dealing with the uncertainty as how much probability I can assign to something, can I take credit for these actions and all the various things on there.

One of the things that strikes me is when

I look at the bounding analysis and it seems like we're trying to get the best of both worlds. We want to address everything in totality and also assure that we don't have that risk.

You know, when I deal with traditional design basis, we are allowed one single failure. And we assume no off-site power. And we give an initiating event that happens, and that is a given.

PRA, we will look at multiple failures. And we may find things that are more vulnerable that weren't even addressed under compliance. And I see kind of a similar thing here except for instead of saying, "Address a single failure," we're looking at "You've got to find them all."

And that just seems like an impossible task. Even in the PRA world, we can model a lot of stuff, but we're still not going to get them all. But we try to find the significant things. We're trying to gear down to get the significant issues.

As far as the workload goes that I see on the generic letter, I think it would be significant. I'm not the circuit analysis person but when I start throwing in non-currently credited equipment into that list that I want circuits routed for and cables routed for, it is a big workload for the electrical guys who

are going to be doing that work. And I would see that as a resource drain on the overall transition effort for me.

In fact, if I saw them, you know, all of a sudden, focusing on one area and not another area, I'm not even sure how they would be able to get all of them without doing the PRA perspective.

MEMBER APOSTOLAKIS: I am a little bit -- I don't know what the right word is, but we keep talking about the workload. It seems to me we should be talking about the real issue.

Is there a real issue here? Is there a contributor to risk that we have not handled in the past or managed well? I mean, the workload I'm sure you will agree, too, it's a major contributor to risk. We have to do something about it.

MR. MISKIEWICZ: I agree.

MEMBER APOSTOLAKIS: And, you know, the thing that made me happy with Duke is that they are doing the PRA. They will consider the multiple hot shorts or spurious situations. Is your company doing something similar or --

MR. MISKIEWICZ: We are doing the PRA. And we're going to in the PRA model the hot shorts, the spurious actuations.

MEMBER APOSTOLAKIS: According to the latest information we have and everything?

MR. MISKIEWICZ: When we say important, too, it's almost, you know --

MEMBER APOSTOLAKIS: You're not going to use .1? You're going to use .6, for example?

MR. MISKIEWICZ: We'll use whatever the methodology recommends.

MEMBER BONACA: You can go to Professor Apostolakis if you remember.

MEMBER APOSTOLAKIS: Give me a call. I'll tell you.

(Laughter.)

MR. MISKIEWICZ: It's .1. And we're working through those issues, but even doing that is going to be limited somewhat. You know, there are screening techniques and things used that we're going to work our way through as to which circuits really need to be evaluated.

MEMBER DENNING: Do you think the approach is clearly defined as to how you come up with a probability for these actuations?

MR. MISKIEWICZ: Right.

MEMBER DENNING: There is some randomness that one assumes in terms of which circuits can

connect with which other circuits to --

MR. MISKIEWICZ: I think what we know now is better than what we knew ten years ago when we were dealing with this.

MEMBER DENNING: Yes. But it isn't obvious to me even what the best approach is to doing that within the fire PRA, let alone deterministically.

MEMBER APOSTOLAKIS: So the position, then, of at least you two gentlemen and maybe the industry is that this generic letter is unnecessary, that you are handling the issue of multiple spurious actuations via the PRA and as you transition to it -- are you transitioning to 805?

MR. MISKIEWICZ: Yes, we are.

MEMBER APOSTOLAKIS: As you transition to 805, you may have to come back to the NRC and, using risk arguments, request an exemption of some sort. Is that your position?

MEMBER BONACA: Well, I heard it differently.

MEMBER APOSTOLAKIS: What?

MEMBER BONACA: I heard it differently. I heard simply that the burden should be on the NRC to perform. Okay.

MEMBER APOSTOLAKIS: But they are handling

it already.

MEMBER BONACA: Yes.

MR. BARRETT: We are handling multiple spurious in the PRA as part of the 805 transition.

MEMBER APOSTOLAKIS: And then what?

MR. BARRETT: And then we're going to follow the industry guidance and the regulatory guidance provided by the NRC. And depending upon where the thresholds fall in relation to the self-approval thresholds, if it's less than the self-approval threshold, then we'll end up self-approving an exemption in accordance with the NRC rules for 805 implementation.

MEMBER APOSTOLAKIS: Right, right.

MR. BARRETT: If it's over that threshold, then we'll end up having to --

MEMBER APOSTOLAKIS: Come back.

MR. BARRETT: -- contact the staff and work out whether we have to modify or whether we can leave the situation as is.

MEMBER APOSTOLAKIS: The conclusion one can draw from this is that you believe that this generic letter is unnecessary because there is already a process in place. Is that correct?

MR. BARRETT: For 805, for their plants.

Not everyone is --

MEMBER APOSTOLAKIS: Why wouldn't another plant apply the same thing?

MEMBER SIEBER: It is an optional process. Some plants --

MEMBER APOSTOLAKIS: Oh, they don't --

MEMBER SIEBER: -- may decide not to do anything at all.

MEMBER APOSTOLAKIS: If they don't transition to 805, you mean?

MEMBER SIEBER: Yes.

MR. MARRION: If I may, Dr. Apostolakis, there are 40 plants that have submitted letters of intent to the NRC. The resolution of this issue for the 805 plans has yet to be determined. The approach is the use of the PRA, do the modeling -- all right? -- and then define that.

But that would be applicable to those 40 plants. The other plants, the balance of the industry, have used any combination of the single failure to three or four failures.

You heard mention of NEI-001 that has the methodology, both -- two methodologies: deterministic and risk-informed. We piloted that at two plants.

And so we can't take credit for that

anymore because of this new position with the generic letter. But I suspect that the solution will be had with the pilot exercise over the next several months to a year possibly and that that's the solution that needs to be evaluated for applicability to the non-805 plants because, absent that, I don't see anyone coming up with a generic solution for the non-805 plants today. And it is going to be based upon PRA.

MR. MISKIEWICZ: Even in 805, though, when we do a fire PRA, there will be some iterative process. You know, we're dependent on the circuit analysis people giving us the information that we need to model. And so we're going to try to get risk to make sure we're modeling the right areas.

MEMBER SIEBER: Just the basic methodology of PRAs causes you to consider multiple spurious --

MR. MISKIEWICZ: If you model all of your singles and multiples from singles --

MEMBER SIEBER: That's the way it is.

MEMBER APOSTOLAKIS: But in the old days, in the first PRAs, I don't think we considered that.

MR. MISKIEWICZ: You modeled your singles. And they would combine in your results to give you multiples.

MEMBER SIEBER: Part of the process.

MR. MISKIEWICZ: Yes. But you would still have to model the spurious event was a failure mode for that specific piece of equipment, --

MEMBER SIEBER: Right.

MR. MISKIEWICZ: -- which depends on the circuit analysis people telling you where that --

MEMBER SIEBER: So the philosophical discussion as to what the assumptions ought to be is sort of moot because the process of the PRA itself takes care of that if it's done thoroughly and done right.

MEMBER APOSTOLAKIS: One of the things that we don't do at this Committee is have presentations or briefings on the actual analysis that the industry is doing.

MEMBER SIEBER: Right.

MEMBER APOSTOLAKIS: I think that would be extremely beneficial to us if somehow we found a way to have the industry come and present a detailed PRA, fire PRA in this case. Anyway, that's a separate issue.

MEMBER DENNING: I think what we would like to do at this point is thank you gentlemen. And we may still ask you in the few minutes that we have left if we have some additional questions. We have

the potential to hear about additional experimental work that could potentially change some perspectives, but I don't think we'll do that.

I think what we ought to do now is we would have some discussion while we still have the staff here and the industry here, we have some discussion? Would you agree, Graham, that we'll have some discussion here, see just kind of where we are sitting on this?

CHAIRMAN WALLIS: I was thinking about that. I think we certainly need discussion.

MEMBER SIEBER: Yes.

CHAIRMAN WALLIS: I think some of it needs to be in our working session, --

MEMBER DENNING: Yes.

CHAIRMAN WALLIS: -- rather than open session, but I think we can do some of it now. What little bit we can do now to clarify the situation certainly we should do now.

MEMBER ARMIJO: I have a question that may not be a discussion. Just in reading the staff's response to a lot of the comments received on the draft, there was reference to a lot of -- where is this thing, the screening tool, a risk screening tool, that the licensees develop a risk screening tool to be

reviewed and approved by the staff.

This is a tool that would evaluate a variety of different multiple spurious actuations and sort them out and say, "These are the ones to worry about. And the rest we don't have to worry about."

What is your view? Does such a tool exist? Do you use such tools, both parties?

MR. MISKIEWICZ: We haven't kind of gotten to that step yet. I'm not exactly sure what the paragraph is you are referring to.

MEMBER ARMIJO: Yes. It's --

MR. MISKIEWICZ: But we can do sensitivities and say, "If I just fail the system, you know, a functional type of thing, if it's not significant, then I don't have to go down deeper and model all the individual spurious. I can screen it by saying it's not going to matter without doing the detailed modeling," you know.

MEMBER APOSTOLAKIS: The screening depends on a number of factors, this being one, but the other is the amount of fuel you have in your area, whether you can have a fire to begin with, the fire PRA.

MEMBER ARMIJO: I thought it was here is a large number of conductors that can cause spurious actuations of a large number of systems. And nobody

has defined what scenarios are worrisome. It seems to me like it's a large number of mind-boggling barriers. And how do you sort those all?

MR. BARRETT: Let me address that.

MEMBER ARMIJO: Yes.

MR. BARRETT: One of the things that Duke has done -- and I think Progress is going to follow suit when they actually do their PRA -- is we have attempted to put our arms around the most significant multiples that we could think of by putting together an expert panel of people who know the plant, know the Appendix R design, no fire protection, and postulate these in an organized fashion, like going through PNIDs and plant design records to say, "All right. What are the real multiple spurious combinations that would really hurt me?" and capture those in scenarios so that they can be analyzed in detail in the fire PRA so that we can really look at the risk.

We're looking at it taking a three-pronged approach. We have the Appendix R analysis that says, "Here is all the safe shutdown stuff that I've got to have. Here are the cables and where they go in the plant. And then here is what gets damaged in each fire area."

And we take the expert panel. And we say,

"Well, is there anything we missed? You know, is there something out there that because you end up flushing the toilet over here and you end up turning that light bulb on, the combination of things gets you something you didn't expect?" The expert panel is supposed to deal with that.

And then we also look at the PRA and true up all AOVs, true up all MOVs, and see if those kinds of things give us surprises that we didn't expect. Between the three of those, we think we're going to end up probably having 95 percent of the risk-significant scenarios.

MEMBER DENNING: For all of your plants, do you know where your cables are by tray?

MR. BARRETT: We didn't. We ended up having to pay to have that analysis done for us. I think it was originally determined in the '80s but was not captured in a database or anything. And we had to go back and --

MEMBER DENNING: But you had that for all your plants, do you?

MR. MISKIEWICZ: I wouldn't say all of the plants. That's a lot of work. In a lot of cases it's limited to the set of equipment that met the rule for the Appendix R compliance --

MEMBER DENNING: It seems to say that --

MR. MISKIEWICZ: -- or our equipment that we want to credit from PRA perspective because there is risk-significant equipment in mitigation that is not within the scope of Appendix R right now. And that we'll add to the list. And some of those still need to be routed.

MEMBER DENNING: You do have additional cable routing that you would have to determine; whereas, you feel that you have already done the --

MR. BARRETT: There were some things in the PRA that we had not addressed in safe shutdown, and we're going to have to have --

MEMBER DENNING: Well, PRA is one thing. What about with this requirement? Does that change? Would you have to -- if this was imposed on you, do you think you have to do more cable tracing?

MR. BARRETT: What I'm talking about is our attempt to try to get our arms around all of the risk-significant scenarios.

MEMBER DENNING: Scenarios? Okay.

MR. BARRETT: So that's why we did the expert panel and all of that, to try to get our arms around things that we would have otherwise missed.

MEMBER DENNING: You keep saying

"risk-significant." And we're in a space here where we're not necessarily risk-significant. It's broader than that.

MR. BARRETT: I think if you take all of the cables and you just fail them all and you say they all happen immediately, you're done.

MEMBER DENNING: You can't survive.

MR. BARRETT: Some of these areas you can't survive it.

MEMBER DENNING: Okay.

MEMBER SIEBER: On the other hand, from a risk standpoint, the set of cables that you have to know what the routing is becomes larger than the Appendix R set.

MR. BARRETT: Yes.

MEMBER SIEBER: But it is certainly not all of the cables. So there is going to be some physical work that has to be done if you don't have pull ticket. If you don't have the database, you can't --

VICE CHAIRMAN SHACK: In the NEI-001 guidance, where, as I understand it, you do up to four failures, how do you select those four?

MR. BARRETT: A similar process with the expert panel and using Appendix R analysis, a similar

process.

MR. FRUMKIN: This is Dan Frumkin from the staff.

One of the things that we have discovered about defining a failure is a lot of the analyses assume once spurious actuation, once spurious actuation, what the NEI or at least the risk, 2,403 -- and I think NEI-001. They talk about multiple hot shorts.

Now, one pair of conductors coming together could cause numerous different spurious actuations. So I think that the staff and the -- well, the staff has come out with 2,403 and has put it on the table.

We are looking for this hot short. That could cause whatever it could cause. We're not counting spurious actuations anymore. We're taking that hot short and saying, "Well, what could it cause?"

I think there was a situation where there was one cable or just a number, just a few conductors, or maybe it was even two conductors that could give an indication which could open all of 16 SRVs at one plant.

Now, a long time ago that might have been

16 separate spurious actuations. And today we're looking at that as one pair of conductors coming together. And I think everybody is pretty much on the same page that yes, obviously if the circuits can cause all of those spurious actuations, we consider that.

MEMBER DENNING: Well, I guess a comment that I would have on generally what I have heard is that I think it's very clear that there are timing issues. If we go forward with the generic letter, then, at least in my interpretation of the generic letter, there are timing requirements that are not doable by the industry and that one would have to do some relaxation of that. And I don't see where just having the 30-day, where they can say, "It's going to take me longer as appropriate."

Now, it could be that maybe this should be more of an information-gathering generic letter, rather than one that is quite forcing the NRC's position about the need for multiple spurious actuations without a more relaxed position like NEI's.

I guess what I'm looking for are general comments as to people, where they are seemingly falling on this generic letter.

MEMBER MAYNARD: Well, I would agree with

most of your comments there. First of all, I do believe that it clearly constitutes a backfit. We will get into some other things later on that, but we don't have to change regulations to be changing requirements. A change in staff position on what is acceptable for meeting a regulation, changing those position, also constitutes a backfit.

With that said, I would also like to say that this issue needs to be resolved. I think playing around too long about what is the right regulatory process isn't going to serve everybody's best interest either.

I think it is important. This issue has been around for 25 years. It needs to get resolved in an approach going forward as to what is it going to take to either make it go away as an issue or to actually fix it.

I think the 90 days, I think basically if it goes out the way it is, basically you're going to end up with everybody coming in with time request extensions. And so I don't think that's really the right thing to do there.

If it goes out the way it is, I think it needs to extend that time. I think it might be better to go out with what is truly an information request,

to gather information to then be able to determine what the next steps are.

But, again, I don't think process should drag out for another 5 or 10 or 15, 20 years. Something needs to be done to put it on a resolution path.

VICE CHAIRMAN SHACK: Let me just come back to that for a second. I mean, we know what you expect from the 40 plants that are going for NFPA 805. What do you expect from the others?

MR. WOLFGANG: This is Bob Wolfgang again.

I think a number of them are going to come back and say, "We meet our licensing basis, and thank you very much. And good-bye."

MEMBER DENNING: Will they really say that? I mean, your --

MR. WOLFGANG: That is one thing.

VICE CHAIRMAN SHACK: Will you accept that answer?

MEMBER SIEBER: Send it over to enforcement.

MR. WOLFGANG: No. No, we won't. What we will hear from others is --

VICE CHAIRMAN SHACK: What would you consider an acceptable response from the others?

MR. WOLFGANG: Well, "We don't address multiple spurious actuations. Here is our plan to address it to do" X, Y, Z. I don't know. "Do physical mods."

MEMBER DENNING: That's a six months' answer.

MR. WOLFGANG: Yes. That will be the six-month answer. But initially, yes, either you meet it or you don't meet it. We don't think we meet it. We think we meet it.

For the first round, that's all I think we're going to get.

MEMBER DENNING: Getting back to this backfit question, I'm not sure that ACRS is the appropriate one to answer that. Obviously it makes it easier for the regulatory staff if it's not a backfit question.

MEMBER BONACA: Yes. One thing that troubles me a little bit is, you know, is it a significant issue or is it not a significant issue? That's a plant-specific answer. And so we're not going to find out an answer to the question.

And I think that if we had to perform a generic evaluation to justify a backfit, I'm not sure that it could be done because, I mean, it's so

specific to the plant, the age, to whatever the situation may be.

MEMBER DENNING: But this question of a specific issue, I think you can do a reduced analysis to determine. I think you can screen out stuff a priori --

MEMBER BONACA: I think so, too.

MEMBER DENNING: -- you know, so that it isn't such an onerous job to determine what's important and what's a potentially significant risk contributor here.

MEMBER BONACA: Clearly, I mean, something has to be done. I mean, we have new evidence in front of us. And I completely agree with you, Otto, that it can't wait. They have to be dealt with.

I think that, however, the industry needs more time to deal with this. They don't have a ready-made process by which they can screen this out and address it. So the issue is more the time.

Now, the next statement again, as reported to you, is the fact that we are not really the best charges of what is the most appropriate regulatory process to follow to go ahead with this.

MEMBER APOSTOLAKIS: Our job here is to judge the generic letter as presented to us.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I am just wondering how we add value to this. If we were a subcommittee, we might well say, "Look, we now know what the issues are. We think there must be a better way than having the agency send out this generic letter asking for things which may be impractical for some plants," but, then, there should be some way to work with the plants to figure out what is the right solution to this technical problem. I'm not sure.

We're also sort of a facilitator between industry and the agency, and that's not really our job, though, is it?

MEMBER SIEBER: Well, the other thing that is not our job is to try to figure out whether it's a backfit or not. That's a legal question.

CHAIRMAN WALLIS: Well, we don't even know how important it is because we don't have these proper risk analyses.

MEMBER DENNING: Well, having resolved these questions, I now turn it back to you, Mr. Chairman.

(Laughter.)

CHAIRMAN WALLIS: I can make a very decision, which is to take a break for lunch. We are

going to be ethics-trained at 12:15. And then we go to work again at 1:30. Thank you very much for your presentations.

We'll take a break, and as a Committee, we're going to be back here, not on the transcripts or anything, for ethics training at 12:15. We'll start the official proceedings again at 1:30.

(Whereupon, a luncheon recess was taken at 11:33 a.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:33 p.m.)

CHAIRMAN WALLIS: Back into session. The next item on the agenda is another generic letter; first of all, underground cable failures that disable accident mitigation systems.

Our cognizant member is Mario Bonaca. I will hand over the meeting to him. Please go ahead, Mario.

MEMBER BONACA: Thank you, Mr. Chairman.

3) DRAFT FINAL GENERIC LETTER 2006-XX, "INACCESSIBLE OR UNDERGROUND CABLE FAILURES THAT DISABLE ACCIDENT MITIGATION SYSTEMS"

3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have a presentation from the staff. They are proposing to issue a generic letter on inaccessible underground cable failures that disable accident mitigation systems.

We have recently become conversant with this issue through license renewal. You may remember that the GALL report requires for license renewal the existence of two programs: one, a program to detect the presence of water and the watering actions; and the other one is a program to test the cables and essentially-- so we are aware of the concern here.

And the staff is now addressing this issue in the current licensing area.

And so, with that, I will turn to the staff. Mr. Mayfield?

3.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MR. MAYFIELD: Good afternoon. I'm Mike Mayfield, the Director of the Division of Engineering. And my division is sponsoring this generic letter.

We're here this afternoon to seek ACRS endorsement to publish the generic letter. The generic letter, as Mr. Koshy will describe, provides some information to licensees on the significance of these potential failures, and seeks some information from licensees regarding the monitoring of these cables.

Tom Koshy from the Electrical Engineering Branch will make the presentation.

MR. KOSHY: Thank you, Mike.

As Dr. Bonaca mentioned to you, this was first brought to your attention as a problem during the license renewal hearing at the ACRS. The question was, is dewatering every ten years going to prevent the problem?

At that time, in light of the failures

that we had noticed at the time, we thought of taking it as an operating reactor issue under Part 50. And we did some serious looking into see how big the problems are.

The safety concerns identified at the time were some of these underground and inaccessible cables supply power to some safety-related components. Using some examples here, the off-site power, the cable that brings the off-site power, to the safety buses.

The second would be the emergency diesel generator feeder. This is critical in those cases where the emergency diesel generator to building is physical apart from the main building so that the underground cables bring into power; and then the emergency service water pumps, these cases where the pump house is located again, you know, physically away from the plant so that the power supply to the service water pump has to go through underground cables.

And failure of one of these cables could affect multiple systems in these sense there could be a train, cooling off of safety systems, collectively influencing more than just one isolated system.

Most of these failures that we came across did not have any direct reference to having a qualification for this cable to withstand the moisture

environment or, essentially, you know, in duct banks, if it is immersed in water, you know, can it withstand. That type of qualification had not been in existence for these cables that we came across.

MEMBER BONACA: Let me understand now, however. These are cables in safety-related applications?

MR. KOSHY: Yes.

MEMBER BONACA: Okay. So evidently on day one, when the plant was built, there was no expectation that the cable would be wetted?

MR. KOSHY: Yes. In fact, they thought it would stay relatively dry, but as duct banks develop cracks, you know, there would be traffic about it. And eventually these things crack. And depending on the water table, you know, it could be immersed for a long time or maybe a short time.

MEMBER BONACA: Well, in many cases, these cables are buried --

MR. KOSHY: Yes.

MEMBER BONACA: -- in the ground. So from day one, there was an expectation that they would see humidity and why we are not environmentally qualified.

MR. KOSHY: Either it was not specified at the time or they thought that, you know, the existing

material at the time could withstand some level of moisture. For some reason, they did not specifically seek out.

The reason I stated that is, you know, much in the later period, now we have cables that can withstand such highly moist environment. In fact, I know of a case where they have run the cable to the river. That's for a --

CHAIRMAN WALLIS: But not forever.

MR. KOSHY: Excuse me?

CHAIRMAN WALLIS: Just because they are qualified doesn't mean they will survive forever in this environment.

MR. KOSHY: You are right, yes. Yes. They may not survive forever, but at least, you know, they have some demonstrated capability for a certain period that it can be even immersed in water and still do its function.

But all of that addresses, you know, the possibility that you need to know the condition of the insulation so that you have that confidence that it can do its function for the foreseeable future.

We went back into the history of the LERs that we have on record. We saw failure at 17 sites and cable replacements at 100 or so. And most of the

faulty cables were not discovered until there was an operational failure.

Again, these are based on LERs, where the system has a redundant system or some reason, because of a plant trip or the failure was serious enough it prompted an LER.

MEMBER ARMIJO: What is your definition of a medium cable?

MR. KOSHY: 5 kV.

MEMBER ARMIJO: And above?

MR. KOSHY: 5 kV. Well, in the sense of when you go into 13 kV, you know, some people label it as medium also.

MEMBER ARMIJO: Okay.

CHAIRMAN WALLIS: High tension.

MEMBER SIEBER: Four-eighty volts to --

MR. KOSHY: Four-eighty will be below that. Yes. We will not call that medium, yes.

MEMBER SIEBER: Four-eighty is --

MEMBER BONACA: But you include those?

MR. KOSHY: Excuse me?

MEMBER BONACA: But you include those in the --

MR. KOSHY: Yes, we are including those because there are certain plants where the emergency

diesel generator generates voltage at 480 and emergency service water and safety pumps are at 480 volts, some small plants and early vintage.

MEMBER BONACA: Okay.

MR. KOSHY: So we wanted to include that also. That's why we went more than just medium voltage.

The EPRI data indicated about 65 cable failures. And later the white paper which NEI has submitted indicated about 55 failures for about 15 plants.

Most of the cable failures have what in common? It's about 12 years of age. And the cable was subjected to some type of, you know, moisture environment, probably for a longer duration or a shorter duration. And these things were essentially common factors.

The cables, again, that we are focusing on is about roughly about six to eight cables, you know, depending on the design uniqueness, the cables that can have the most, let's say, significant impact on the plant.

MEMBER MAYNARD: The cable was about 12 years old? You're saying that all of these failures were about the same age or --

MR. KOSHY: No. More than that. There are some 20-plus.

MEMBER MAYNARD: Okay. All right.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: It was at least 12 years old. At least 12 years. I was trying to figure it out. If it's every 12 years, that's pretty severe.

MR. KOSHY: You're right. Twelve and above. So in this generic letter, what we are focusing on is power cables that are within the scope of the maintenance rule, including cables connected to off-site power, emergency service water, and the other examples that I stated before, and those routed through underground or inaccessible locations, such as buried conduits, cable troughs, above-ground and underground. And these are the things that we are considering to be within the scope of this generic letter.

The benefits of this program are gaining confidence in the capability of the cable to respond to design bases events. To give you an example, at Turkey Point after the hurricane, the diesel had to run for about a week continuously. And thereafter for a month's period, the diesel had to come back on for other spurious power outages.

So if you are looking into an accident where it has to be on a LOOP condition where these cables may need to be relied on for a few weeks. So we are not looking at a few hours of operation. The confidence needs to be gained for a period much higher than a few hours, which is usually the subject of our maintenance and surveillance activities.

MEMBER BONACA: Do you have examples of failures in service that were not exhibited during functional testing?

MR. KOSHY: What we have, the reported failures are a combination of both. Some in-service failures certain plants appear to have more than others. And others, when you start for surveillance, you find out that, you know, after a couple of hours, it fails.

So the LERs that we recorded are those cases where the plant impact was significant, so in the sense either operational. And if it is purely during a surveillance, we will not get an LER report on it.

So that's some of the problem that we are facing. The LERs that we received are so limited in number because, you know, it had to either bring a plant down or give an easy access situation for us to

plant an LER report.

So that's why we are focusing on getting a handle on the extent of failures so we can engage them and see what other actions would be necessary.

CHAIRMAN WALLIS: Could you explain something to me?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: I can understand off-site power sort of coming in on the underground cable. Why is diesel generator? Why does the diesel generator have underground cables? Is it part of the plant?

MR. KOSHY: Yes. For example, in some plants, the building is a separate building.

CHAIRMAN WALLIS: It's in a separate building. It's in a separate building.

MR. KOSHY: Yes. For example --

CHAIRMAN WALLIS: Okay.

MR. KOSHY: -- they have separate building.

CHAIRMAN WALLIS: They might be in a separate building?

MR. KOSHY: Yes.

CHAIRMAN WALLIS: That's very different from, say, something that comes from off-site power,

where the cable may be a long cable from --

MR. KOSHY: Yes. That will be significantly longer. That will be from the switchyard. In some cases, you will have a situation closer to the plant, where you bring down to 13 kVR or so.

CHAIRMAN WALLIS: Okay. Thank you.

MR. KOSHY: The next benefit is we can prevent the unanticipated failures that cause plant transients by using the maintenance rule as the scope. We are also looking at challenges to the plant in the sense of what will give you a plant transient. So that is what is seen as the scope of this generic letter.

The next is you can use a convenient outage if you know the rate of degradation. Rather than taking, you know, unwarranted outages, you can schedule that cable replacement for a convenient refueling outage and do the replacement with minimum interruption.

CHAIRMAN WALLIS: Are these cables usually designed so they can easily be pulled through to repair them?

MR. KOSHY: No. It is very time-consuming, most of the --

CHAIRMAN WALLIS: There's not a big duct in the cable and you just drag through a new cable?

MR. KOSHY: No.

CHAIRMAN WALLIS: No? You have to take it out? You have to dig it up?

MEMBER SIEBER: It's the whole thing. No.

MR. KOSHY: Well, pull-through is there, but the thing is it has a lot of staging. And you have energized equipment on both sides. So you need to essentially take some bus outages. So it is significantly time-consuming.

CHAIRMAN WALLIS: Yes, but you don't have to dig it out?

MR. KOSHY: Unless it is direct buried cable.

MEMBER BONACA: In fact, I mean, for example, yesterday during the review of Monticello, the majority of their underground cable, they're buried.

CHAIRMAN WALLIS: Those are usually utility duct or something, in other words.

VICE CHAIRMAN SHACK: This is direct buried.

CHAIRMAN WALLIS: Direct buried cable?

MR. KOSHY: Those are not exceptions.

Usually you will have a duct bank with some sleeves in there so that you can pull through it.

MEMBER BONACA: And it depends on the age of the plant. I mean, Monticello is an older plant. They buried it, and that was it.

MR. KOSHY: So you have a wide variety on those?

MR. MORRIS: Tom, George Morris, EEEB. Some of the original cables that were pulled through duct bank, all of the original cables that were pulled through duct bank, were pulled through with the use of cable lubricant to reduce the friction. After they had been in there for a while, that lubricant has dried up.

MEMBER BONACA: It doesn't work.

MR. MORRIS: In some cases, it's almost like concrete.

MR. KOSHY: Okay. Moving on to some examples, Oconee is a success story where they found that two of the six cables had significant degradation. And they were able to monitor it and take the outage at a convenient time so that they can replace them.

Another example I am using here is Peach Bottom. When they experienced a failure, they decided

to make a global replacement. You know, they didn't want to do any testing at all. And that's also a solution.

CHAIRMAN WALLIS: Now, is it always water that leads to degraded cables? It seems to me that you could have a cable and a duct which might just -- you know, the insulation can over a period of time oxide or whatever it does. I mean, even in your house without water, you get cables that --

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The insulation cracks and so on.

MR. KOSHY: This has some influence in the sense if it is a dry insulation and there is only cracks, chances are it will survive a little longer.

CHAIRMAN WALLIS: That's right, but it may --

MR. KOSHY: The presence of chemicals --

CHAIRMAN WALLIS: Makes it work.

MR. KOSHY: -- create default.

CHAIRMAN WALLIS: It's not essential that you have moisture, is it?

MR. KOSHY: Right. You're right. We are not trying to look at the root cause of what causes the failure. We are more interested in seeing,

irrespective of the causes, let's have a program in place so that we can prevent such unanticipated failures and have a great confidence in the accident mitigation capability. So that's the focus we are trying to get because for --

CHAIRMAN WALLIS: There is no routine measurement of, say, resistance of ground of a cable? There is no routine --

MR. KOSHY: There is some technology developing that way, but online systems have not been doing that well. I think the industry is headed that way and there is some aggressive effort in the industry for coming up with something like that or, rather, building confidence in the systems that are now under development.

Oyster Creek is an example where they replaced the cables and they had few repeated failures. This design is also unique. They essentially had this cable going about 200 feet away from the main plant as an extension of the safety bus. And this is remaining energized all the time. And that earlier had several failures.

So the information that we are requesting is provide to us a history of the cable failures in the scope that I discussed just before and a

description and frequency of the inspection, testing, and the monitoring programs in place. And if you do not have a monitoring program in place, explain to us why such a program is not necessary. So that is essentially what we are asking in --

CHAIRMAN WALLIS: So this is really information gathering. This isn't requiring an action?

MR. KOSHY: Right, right.

VICE CHAIRMAN SHACK: Now, are you distinguishing between a monitoring program and a functional testing program here?

MR. KOSHY: Okay. The explanation that we have given, in fact, I am addressing as a response to a public comment, what we are saying is the functional testing that you do that you energize for a short period doesn't give you any confidence that it will do it again.

VICE CHAIRMAN SHACK: Okay. So you're not counting that as a monitoring program?

MR. KOSHY: Yes. We are not.

MEMBER SIEBER: A surveillance test.

MR. KOSHY: These are the organizations that have given response to the first version that went out for public comments. And I will address the

highlights of how we addressed those comments.

Cable failures are random. And, therefore, no NRC action is required.

CHAIRMAN WALLIS: It sounds like saying they're an act of God or something.

MR. KOSHY: Yes. We just explained the surveillance activity, which wouldn't give you confidence on its future performance. You need to in some way monitor the condition of that insulation so that we can build that confidence.

Again, you know, this is the small group of cable where you have this problem. Otherwise, the rest of the cable is in a dry environment. Next to selectable sealed-in concrete, you know, these cables should be the most reliable piece of equipment in a plant, you know, should not be failing for about 40 years or, in fact, for 60 years, you know, if it is the environment and the conditions are right.

And I quickly explained before that the low-voltage cables are included because some of the early vintage plants have this 480-volt equipment for safety buses, diesel, and naturalized emergency service water, and service water equipment.

CHAIRMAN WALLIS: The original sentence is garbled. It doesn't matter. Essentially we have a

period after impact, and that's all right. Scope is limited.

MR. KOSHY: Okay. Again, we just addressed this issue, why this basic surveillance tests of operating for a half an hour or two hours wouldn't be sufficient to gain that confidence for --

CHAIRMAN WALLIS: What you do is you put on them the voltage that they would have in operations and --

MR. KOSHY: No. You actually energize a --

CHAIRMAN WALLIS: Do you actually have to have current going? Do you have to current going through these cables to test them or does it have the voltage applied to them and see if there's a leakage?

MR. KOSHY: Yes. There are about eight or ten techniques in the industry.

CHAIRMAN WALLIS: There's a whole lot of techniques.

MR. KOSHY: Yes, yes. And the thing is the early technique was just apply very high voltage and make it fail. That was the most crude way of doing it.

MEMBER SIEBER: Meggering.

MR. KOSHY: Meggering is another method,

but that has certain weaknesses, too.

MEMBER SIEBER: You have reflective techniques.

MR. KOSHY: Yes. Time domain reflects III, and about six or eight techniques are there. And there are still some under development. Collectively you have about two IEEE standards that go into details of the type of tests available and the level of confidence that you have based on the type of cable.

So depending on if you have a shield and what kind of shield and what type of rubber material is used, the level of confidence is different, you know, depending on the type of test that you do.

So there is some industry that two IEEE standards are available to address that and which one is better and which one is desired.

MEMBER SIEBER: You can get some pretty high voltages in these cables from switching transients.

MR. KOSHY: That's true.

MEMBER SIEBER: It will go well beyond the rating for a very brief period of time. And sometimes that's when the insulation fails.

MR. KOSHY: Yes.

MEMBER BONACA: By "surveillance test,"

you mean surveillance of the equipment and this power by the cable?

MR. KOSHY: Right. You are giving normal voltage and normal function of a couple of hours, you know, like in the pump in service inspection or type of surveillance you will expect to run in for two or three hours, make sure it is for using the rate of flow and things like that. That's the type of test that will not give you a feeling of how good the insulation is. Will it last for the next two weeks of runoff?

The regulatory basis for our cable monitoring is we have added that what is seen in bold, that condition is something that we really did not have in the first version. And we are essentially saying that "assess the continuity of the systems and the condition of the components." So you need to know the condition of this insulation so that we can have that confidence on its performance.

MEMBER ARMIJO: Could you expand that? Condition based on electrical properties? Are you actually looking for physical condition? They're in accessible.

MR. KOSHY: These are inaccessible, but you do have state-of-the-art techniques available in

electrical testing which will measure the testing of the insulation.

MEMBER ARMIJO: Okay.

MR. KOSHY: So if you can establish that the integrity of the insulation is reasonable, then you have that confidence that it will not fail in the most probable cases.

MEMBER ARMIJO: Thank you.

MR. KOSHY: The question was regarding multiple cable failures. The only example that we have collected in light of our efforts is a case where one insulation failure was in the circulating water pump, resulted in taking two other substations out with it.

The possibility that we are talking of is the fault itself causes a transient and sends some transient current. And if you have some near-failure equipment, that can be a cause for additional failures. You know, these are speculative problems. And this is the only example that we have on record for that.

Now, the modifications that we have done in light of the comments on this are editorial in nature, a good part. We revised the scope to include the above-ground and below-ground duct banks; removed

the broadband spectroscopy because that's not a proven technique yet, but, again, that could be a technique available in the future; revised the requested information to include the type of service so that we will be able to know if there are repeated failures in a certain area. And we revised the date collection time to 60 hours.

CHAIRMAN WALLIS: So it would seem that there is still a gap between your view and the industry's view.

MR. KOSHY: Yes.

CHAIRMAN WALLIS: The industry had some pretty strong comments. And your modifications don't reflect large changes in response to their comments.

MEMBER SIEBER: Right.

CHAIRMAN WALLIS: So there would seem to be still a big gap between your view and the industry's view. Is that true?

MR. KOSHY: I will address that in the next slides along with the NEI white paper issues, in slides 16 and 17.

CHAIRMAN WALLIS: Okay.

MR. KOSHY: We presented this to CRGR. And CRGR asked us to do two improvements on the generic letter: to bring the focus on the power

cables itself and also to add a safety-related example to show the significance of this failure on a plant. In the package that you have received, we have incorporated those changes.

We received the NEI white paper much after the comment period on May 1st. I have addressed the highlights in this coming couple of slides. One is a graded approach. Again, the number that you see on the top is the sections that correspond to the NEI white paper, 6.6.

The graded approach for monitoring and replacement of cables, the bullets are many cables do not power safety-related equipment; and the other one, graded approach to replacement and monitoring is best for safety and business reasons.

Our response is that we are only focusing on those that are significant. That's the very reason that we are using to bring the scope down to the maintenance rule. And we mentioned certain systems in there because to, let's say, overcome the variances and interpretations on that rule and also because those examples that we state there are the ones that have most impact on the plant in the sense affecting multiple systems.

Therefore, these are classified as most

important because of these reasons. And, therefore, you know, it will be important to prevent the transients and also in supporting of mitigating the accident.

So that's how we have narrowed the scope and as to bringing down to only important cables and not all of the cables at large. And the numbers that you see in that white paper are some plants have like 300-plus cables. And that won't be within the scope of maintenance rule.

The next one, the recommendations again in chapter 8, is provide dry environment, prepare for cable failures, and share failure resolutions.

Providing a dry environment -- again, you know, these are all installed cables. It's not quite practical. And pumping out would help. It will slow down the failure, but it cannot prevent the failure. It may take a little longer. And these cable failures could affect many systems. And the replacement of these cables is very time-consuming.

So if you have a valid accident mitigation method and at that time trying to make this cable replacement could be very difficult because the cables that run in the same duct banks could be helping the accident mitigation at that time. And your cable

pulling and taking bus outages would not be desirable actions when you run into an accident environment or facing a LOOP or a station blackout.

And the technique is available there to have that reasonable confidence so that we can rely on these cables for continued operation.

That's all we have prepared for presenting to you. And if you have --

MEMBER BONACA: I have a question --

MR. KOSHY: Sure.

MEMBER BONACA: -- regarding in the generic letter, you talk about 23 LERs --

MR. KOSHY: Right.

MEMBER BONACA: -- and two monitor reports. Then the letter says that you believe that this is a very small fraction. That is the word used in the LER in the generic letter, a very small fraction of the actual failure to take place, which tells me that the number of failures that happen may be in the hundreds.

What is the projection? What does it mean that 25 in total is a very small fraction?

MR. KOSHY: It's very difficult to make such an estimate, but let me give a personal experience that I know of. I was at an AIT for a

plant where they had such a cable failure. At that time they had six cable failures already when we had the AIT in the mid '80s. So that is repeated failures happening at one plant.

MEMBER BONACA: Okay.

MR. KOSHY: Again, I know of another Northeastern plant where they have all of these service water cable and emergency service water cables going through manholes. And they had splices in that also. And this manhole gets filled with water. And when the manhole cover knocks out, that's when you find out the splice failed. They had also quite repeated failures.

So certain plants may have a higher susceptibility because of groundwater and the design uniqueness. There may be some plants in absolutely dry environment, like WNP 2 in the middle of the desert. They may not have any cable problems because it's always dry. and if it all drains, it dries out so fast. So some plants may be fully exempt from this problem.

If the water table is a guide, those are the ones where you have high susceptibility and failures. And some plants are kind of glaringly different than others.

MEMBER BONACA: The information you are requesting is regarding all cables, right, not only those in a weather condition?

MR. KOSHY: All cables and inaccessible.

MEMBER BONACA: Inaccessible.

MR. KOSHY: Yes.

MEMBER BONACA: Exactly. Okay.

MR. KOSHY: So plants where they did not have failures would not have anything to report. But if you had failures, we would like to know them --

MEMBER BONACA: Yes.

MR. KOSHY: -- so that we can kind of gauge, you know, are there repeated problems, what are the vulnerabilities, and based on that probably share the lessons and see if you have to take further action. Maybe it's down to a few plants. We do not know that because we lack the data to support that.

And the NEI white paper data shows about 15 plants having about 45 to 50 failures. That could be an indication because they focused on underground and medium voltage only.

MEMBER BONACA: But your monitoring program that you're talking about doesn't deal only with cables that failed. It deals with cable aging that may be operable during functional testing that

failed during demand, service.

So how are you going to gather information regarding these kind of cables?

MR. KOSHY: Okay. What we are saying is if those cables are within the scope of maintenance --

MEMBER BONACA: Yes.

MR. KOSHY: -- and they're underground and inaccessible, tell us if you have failures. And do you have a program when they have this susceptibility for failure to make sure that it wouldn't fail?

MEMBER BONACA: I understand.

MR. KOSHY: So you're not on the scope. Tell us what the failure is. And see how you monitor.

MEMBER BONACA: Right.

MEMBER ARMIJO: I have a question. How can you have a failure of above-ground inaccessible cable without water? Is it --

MR. KOSHY: Okay. What happens is, you know, even in some large conduit connections which go on the surface because of the variance, you get condensation built in there unless you have a way of venting it out.

MEMBER ARMIJO: Well, it could be a significant amount of water.

MR. KOSHY: You could collect all the

time.

CHAIRMAN WALLIS: You get a humid day and a cold night.

MR. KOSHY: For the condensation and --

MEMBER SIEBER: You can get cable failures from things other than water.

MR. KOSHY: Yes, other chemicals and other leeching, yes.

MEMBER SIEBER: Chemicals, overheating. You know, that degrades insulation or defect in splices, for example, if --

MR. KOSHY: Yes. Splices is another vulnerable point.

MEMBER SIEBER: It's handmade.

MEMBER MAYNARD: A couple of questions. On the provided inscription of the frequency of all inspection testing, monitoring, are you talking about what is currently in place or are you asking the licensee to go back to day one for all of what testing has been done?

MR. KOSHY: We are asking for what you have in place now so that you can put in place such unanticipated failures.

MEMBER MAYNARD: Okay. And the other thing is, is the staff coordinating in any way? This

is requesting this information to be within 90 days.

MR. KOSHY: Right.

MEMBER MAYNARD: And it would appear to me that if the other generic letter on the spurious actuation gets issued, a lot of the same resources could be required or needed for a lot of these activities, both dealing with electrical circuits, just --

MEMBER SIEBER: This one is pretty --

MR. KOSHY: We will work with the Generic Communications Division so that we would be sensitive to that.

CHAIRMAN WALLIS: So what are you going with the information when you get it?

MR. KOSHY: What we are hoping is that depending on, let's say, the breadth and depth of the problem as to why widespread, we may have to think of NRC action if that warrants it. We have --

CHAIRMAN WALLIS: You think that there might be some problem. You have this sort of you almost call it a fishing expedition, where you get all of this information. And then you look at it and say, "Aha. Now we have to do something or not." You're not quite sure what you are going to find.

MR. KOSHY: Okay. We know it is a

significant problem in the light of what I explained to you.

CHAIRMAN WALLIS: There have been events, right.

MR. KOSHY: Yes. We have been having events, which either the plant is out or disabled safety systems. And those things kind of give you a flavor of significance.

CHAIRMAN WALLIS: But the result of all of this information gathering might be that you decide everything is okay as it is now.

MR. KOSHY: If the industry has, let's say, commitments to prevent such failures, yes. But if you are seeing failures and repeated failures, we have to rethink what we should be doing. Okay? We are not there yet. We need to --

MR. MAYFIELD: Professor Wallis, this is Mike Mayfield from the staff. As we assess the results we get back from this, we would have to make a decision whether generic action is warranted or is there some plant-specific action that is warranted or things are being managed appropriately as it is. And we just don't know until we get the results back. We have enough indicators to make us believe that we need to go --

CHAIRMAN WALLIS: I think the industry response to the public comments was everything is fine, we're doing the right thing now. You just want the assurance that it really is so.

MR. MAYFIELD: That might be the outcome. And we'll have to see what actually comes in.

MEMBER SIEBER: The third question sort of tips your hand as to what you want. And it says if a monitoring or surveillance program is not in place, explain why such a program is not necessary.

In other words, here's a plant with failures. And they're not testing anything.

MR. MAYFIELD: We might want to chat with them a bit.

MEMBER SIEBER: You gave them the hint. You ought to test something.

MEMBER BONACA: Or you may have a plant where there have been no failures and you have no significant power equipment. Then why should you even have a test? I mean, then you have a threshold for saying, "We don't need it."

MEMBER MAYNARD: I've got a feeling when you get all of this, the actual number of failures if you divide it by the number of plants and the number of operating years wouldn't look that great, but when

you go to group them, there may be some areas where you --

MR. MAYFIELD: Exactly. And that is not an uncommon outcome from getting this kind of information.

MR. KOSHY: One thing you find out is the data that we have at this time is based on normal run and surveillances, not an extended use of like two, three weeks. So what we are trying to see is gain confidence that these cables can continue in service for two or three weeks if there is a station blackout or some reason and we can continue to rely on these cables for that safety function.

MEMBER BONACA: Yes. That is a very important issue, you know, the failure to run. So the equipment starts, but then it won't run for as long as it has to. And that's trickier because, I mean, the number of failures experienced to date doesn't give you a specific insight on these cables. And that's their function.

MR. KOSHY: Right.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: If not, I thank you for the presentation.

MR. KOSHY: Thank you.

MEMBER BONACA: I think Mr. Marrion of NEI --

MR. MARRION: Yes.

MEMBER BONACA: -- would like to make a statement. NEI, of course, produced that white paper that is quite interesting on this issue.

MR. MARRION: Good afternoon. I'm Alex Marrion, the Senior Director of Engineering at NEI.

I do have a couple of comments I want to make about basically what we heard. We haven't seen the staff disposition of the public comments that have been submitted. Nor have we seen the current version of the proposed generic letter.

But I have to tell you I am confused. And the reason for that confusion is that a couple of years ago, I received a letter from the Electric Systems Branch Chief articulating concern with a potential common mode of medium voltage cables. And the common mode failure mechanism was water training. This was based upon a review of 20-some odd licensee event reports.

We had a public meeting with the staff to understand, get a little more of an understanding of, their concerns. And we looked into the licensee event

reports, and they had -- I'm trying to remember. I think there was only one or two that had a potential for being related to the water-training phenomenon that the staff was concerned with.

But it became clear to us that we needed to develop a document that would be an educational piece, if you will, primarily focusing for the industry, but we also felt that the NRC could possibly benefit from it. And that was the basic objective for the white paper that we developed.

The purpose for the educational piece was to articulate a clear understanding of the water-training phenomenon to articulate our assessment of the licensee event reports that the staff was using as a basis --

CHAIRMAN WALLIS: You're talking about a water-training phenomenon?

MR. MARRION: Water training, yes.

CHAIRMAN WALLIS: Training. Oh, I'm sorry.

MR. MARRION: Yes, water training. I'm sorry. I've got a cold, and I'm a little congested. I apologize.

CHAIRMAN WALLIS: That's my misunderstanding. I'm sorry.

MR. MARRION: -- and also provide us a technically based understanding of the application of that phenomenon to basic cable configurations and insulation systems that exist in the power plants today or not in the power plants but exist in these applications today.

We concluded that you can't make a general statement that water training is of concern because it's not applicable to every cable configuration and insulation system that's in the field today.

It appears that the staff is attempting to require a cable-monitoring program. I'm not familiar with the details of the maintenance rule, but I know that the equipment to which these cables are terminated are monitored in the maintenance rule.

And since the cables aren't active components, I'm not sure whether they should be included in the maintenance rule or not. But fundamentally if the staff expectations and basis in this generic letter are not clear, you have the potential of a generic letter basically undermining a regulation.

I don't know if the staff has done a review with the maintenance rule folks within NRR, but I would recommend that be done before this is

submitted.

CHAIRMAN WALLIS: You're implying this, but, in fact, they just say they're gathering information. And it's not clear that they intend to do anything which would change the regulation in any way or interfere with regulation. You don't know what they're going to do.

MR. MARRION: And the licensee has to document a justification of why they don't have a cable-monitoring program. That is --

CHAIRMAN WALLIS: But you're implying that something downstream is going to require this. That's not actually a --

MR. MARRION: No. I'm implying there may be a conflict between what the generic letter is asking for and what is required by the --

CHAIRMAN WALLIS: You're asking for information, rather.

MR. MARRION: Well, okay. That's one way of looking at it. It is a request for information or an attempt to require a cable-monitoring program. And I'll let you folks decide how you want to do that if they want to interpret that.

I think that, you know, the staff has made some comments about, you know, what their concern is.

And it's not clear to me. I have to tell you I'm confused. Maybe it's because of our involvement over the past several years, but I have yet to see any kind of risk analysis or any kind of statistical analysis conducted by the NRC to articulate some level of confidence that they find unsatisfactory relative to the performance of the cable or the equipment.

We have attempted to do some statistical work in our white paper based upon the survey that we had conducted. I'm not happy with the fact that we didn't get 100 percent of the utilities to respond, but we got on the order of 80 percent, I think, 79. something. That has some benefit.

My concern at this particular point is when the generic letter is finally issued, based upon what I heard this afternoon, we're going to have to request a meeting, a public meeting, and probably document further clarification of what the NRC is really interested in this information request as they go forward because it's not clear at this particular point in time. And that's all I have to say. I would be more than happy to answer any questions you may have.

(No response.)

MR. MARRION: Okay. Thank you.

CHAIRMAN WALLIS: You're welcome.

You were suspicious that if they gather this information, then they might use it to require something which they wouldn't be able to do if they didn't have the information?

MR. MARRION: No. It's not clear what concern is trying to be addressed by the request for information.

CHAIRMAN WALLIS: Well, the concern is that these cables will fail. It's a simple concern.

MR. MARRION: Well, where does that concern stop? Do you stop at these cables or do you continue that concern at the equipment, et cetera, that is under continuous surveillance programs and testing? I mean, where does it end?

And it's a concern about having possible unanticipated failures? Well, where do you stop asking that question now that you started on medium voltage cables and the small population of medium voltage cables, I suspect?

So there are some real issues that have to be addressed here because the utilities are going to want to be responsive to the generic letter. My job is to make sure that we understand it adequately so the utilities will be responsive, but right now I'm

not sure we have that understanding.

MEMBER BONACA: Well, if I understand it, I mean, the issue has to do with two things. One is inaccessible equipment that cannot be visually or other means inspected -- so it's a very narrow family -- and then equipment that is really in accepted applications.

And clearly equipment is seeing a water condition or wetness that -- so it's a pretty unique and narrow population, but I think at least I am interested to know what kind of equipment is being powered by this kind of cable out there. And if it is something critical, a generic letter or whatever, connection to off-site power, you know, it's a unique concern.

I mean, we addressed it and discussed it during license renewal because it was significant. And the industry and the NRC worked together on a goal inspection program for those cables.

And where does the aging start? I mean, does it start with a theatre of operation or does it start before? Clearly there is degradation taking place at some point. I realize I don't know all there is necessary to know about that.

MR. MARRION: If I may just offer a couple

of comments?

MEMBER BONACA: Yes?

MR. MARRION: The aging phenomenon begins from the time that the cable is shipped from the manufacturer's facility.

MEMBER BONACA: That's right.

MR. MARRION: And it's exacerbated by environmental conditions as well as operational conditions that wind up stressing the cable insulation system. And a submerged, wetted environment for certain insulation systems has the potential of increasing the aging or the rate of aging degradation, et cetera. That is well-known.

The equipment that's affected here includes diesel generators at some plants at 4,000 or 4,160 volts as well as other plants at 6.9 kV. I don't know about -- I think one of the staff was -- Tom made a comment about some diesel generators operating in the 480 volts. If that's indeed the case, then that's indeed the case.

But mean voltage cable in the industry is characterized as 2,000 to 15,000 volts. So I'm hoping that the generic letter will be very clear of articulating the 480-volt applications. And is it only for that particular piece of equipment or is it

for something else? That's one of the points of clarity that's needed.

We tried to capture in our white paper -- and I hope you've read it; we've made it available to you -- the current state of understanding of cable insulation systems at this voltage level and underground applications and which insulation systems are susceptible to water damage over time.

We have encouraged the utilities to prepare for such failures because if you look at the age of the fleet, we are approaching the end of service life of a lot of these cables. It's typically 30, 35, 40 years based upon normal environmental conditions.

And our recommendation to the industry was don't wait for a failure before you have to deal with this problem because this is not the kind of cable that you typically keep large quantities in inventory at the warehouse, et cetera. And if you're not prepared, you will have an extended outage should you have such a failure.

I don't know if the generic letter is going to speak to that, but I also know that there is not a cable-monitoring system that is applicable and effective and available to the utilities today.

There are some testing techniques that are effective for certain kinds of insulation configurations. And our white paper speaks to that. But based upon the information I have gotten from EPRI, who is pursuing research in this area, et cetera, that there isn't one technique that would be useful. So okay?

MEMBER BONACA: Thank you.

MR. MARRION: Thank you.

MEMBER BONACA: Yes. I think we're scheduled for some closing remarks. Is there?

MR. MAYFIELD: Just very briefly. We believe we have articulated why we need the generic letter. If indeed there is substantive confusion or misunderstanding once we have published the generic letter, we would, as always, be more than willing to meet with the industry and make sure that there is a common understanding of what we're asking for.

This generic letter has been in process for a while. And we do believe we need to move forward to get the generic letter published and allow licensees the opportunity to engage with it. We will be mindful of any conflicts with other generic communications that are going forward where we may be imposing unreasonable time constraints and resource

constraints on the licensees. That's something that we will pay attention to and go back and pulse with the generic communication staff and the other technical staff to make sure we're online there.

With that, unless the Committee has other questions for the staff, I believe we have presented to you the information that we wanted to present. And we look forward to receiving a letter from you. Thank you.

MEMBER BONACA: Any other questions for Mr. Mayfield?

MR. FALLON: I have a question. Mike Fallon with Constellation Energy.

For the license renewal applicants that have submitted under the GALL report, these cables are all in the scope of license renewal, have been addressed in their applications. Are they being asked to resubmit this information again?

MR. KOSHY: This is Thomas Koshy.

This generic letter will fall under the Part 50 program, in which case we are addressing, let's say, something more than what was addressed in the renewal program. So there is a need for making separate submittal to the NRC in response to this generic letter.

MR. FALLON: All of the cables that you have addressed, all of the safety-related cables, are in the scope of license renewal. And whether they're 480-volt or they're medium voltage, they're addressed in those applications.

MR. MAYFIELD: Okay. Let me comment. This is Mike Mayfield from the staff.

You raise a good point. It is something we will look at and make sure we're not asking you to unnecessarily duplicate information. But that is a fair question, something that we'll make sure that --

MEMBER BONACA: Well, I am not aware that license renewal applications have the summary of all of the failures that have taken place. We are going to get to the information.

MR. MAYFIELD: We don't think we are in conflict, but it's a fair question. And we'll look to make sure we are not asking an unreasonable question.

CHAIRMAN WALLIS: But you will be looking at plants which doesn't necessarily have license renewal in prospect.

Are we through with this item now or --

MEMBER BONACA: Are there additional questions for the staff, for industry, for us?

(No response.)

MEMBER BONACA: If none, I think it's over.

CHAIRMAN WALLIS: Thank you.

MEMBER BONACA: And we open it up back to you, Mr. Chairman.

CHAIRMAN WALLIS: Now, I really am reluctant to take a break for an hour. I wonder if we couldn't work on -- is it okay, staff who is an expert on this? Can we work on Mario's letter on this issue right now on just a preliminary basis?

Let's go off the record and work on his letter for half an hour or an hour.

MEMBER SIEBER: We have to come back.

CHAIRMAN WALLIS: Can we do that? You're not ready? We do have a draft letter. Will the Committee agree to work on his letter? We can discuss it now, but I think we can go off the record and discuss our reaction to this generic letter and work on our letter until about 3:00 o'clock. Is that okay with the Committee?

So let's do that. We'll come off the record now, and we will work on this letter until about 3:00 o'clock. We'll have some discussion now off the record.

(Whereupon, the foregoing matter went off

the record at 2:25 p.m. and went back on the record at 3:18 p.m.)

CHAIRMAN WALLIS: We will come back on the record, come back into session.

CHAIRMAN WALLIS: The next item on the agenda is, let's see now, interim staff guidance. Is that what it is?

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: And I will again call on Mario Bonaca to lead us through this one.

MEMBER BONACA: Okay.

4) INTERIM STAFF GUIDANCE AGING MANAGEMENT PROGRAM FOR INACCESSIBLE AREAS OF BOILING WATER REACTOR (BWR) MARK I CONTAINMENT DRYWELL SHELL

4.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

MEMBER BONACA: We have the staff here to provide us with an overview on the proposed license renewal interim staff guidance on steel containment of BWR Mark I containments.

We have reviewed a number of BWRs. And we have often asked the question on the status of the steel liner. And we have seen different proposals by licensees, some of them planned inspections, only metric inspections. Some of the others don't.

And the staff is using a successful

process that has been successful in most of the license renewal applications to date, the ISG process, as a means of proposing an approach that they expect the licensees to follow regarding this particular item.

And so the staff has come here to give us an overview of this process and what they are proposing to do. And I will let the staff go ahead. I don't know if Mr. Gillespie or Mayfield --

MR. GILLESPIE: Yes. If I could, just some opening comments to put in context what Linh and Hans are going to go through. Not only did we do a couple already, but we've got something like seven Mark I's lined up in the queue. And we have a number of very controversial ones in New Jersey, Massachusetts, and Vermont, where there is actually a lot of public interest. And we had no position on the liner itself.

There are some caveats or I'm going to say some wiggle room in this position I'd like to highlight to the Committee by way of how the staff is approaching this because a question at the meeting yesterday at Monticello was, why is it different plant to plant if you're trying to apply a consistent approach.

This is kind of an approach for the plant that's got almost like the optimum conditions, of which Monticello with their leakage control programs and some things they were doing was.

Browns Ferry, an earlier one, which committed to doing some other measurements, actually had an operating history of having leaks. And so they had moisture content in there. And so we actually have -- this is a minimum condition, as we would look at it.

And there are also some wiggle words, quite honestly, in this. And that's where it says first you have to establish a degradation rate, basically. And then if you get moisture, this basically treats moisture in the outside of the shell the same as visible accelerated corrosion on the inside.

And we're using the ASME code kind of enhanced inspection, but, instead of referencing the code, we described the enhanced inspection in it in case the code changes in the future.

So we're bringing definition to an equivalence to inside and outside indications. And there is still a lot of room on how you establish the rate and what is the credibility of the rate.

And so if you have a history as a facility of having leakage and, therefore, moisture in there, then I think the Committee should expect the staff in establishing the rate in those wiggle rooms because it says if you have moisture, reestablish your rate again -- and the only way to factually reestablish the rate is likely do a UT measurement and then connect the dots again. Literally a simplistic way of looking at it is a regression line between the now additional point.

And so Hans in his efforts as a reviewer still has a lot of room in what are the uncertainties in establishing the rate. And it's those uncertainties which kind of differentiate one plant from another. How do you reduce those uncertainties given different operating histories?

And so that's really how come Monticello is different from Browns Ferry. It's strictly operating history and the uncertainty involved with known moisture leak on multiple occasions.

So, with that, let me turn it over to Linh because that's just kind of the context. Linh, take it away.

4.2) BRIEFING BY AND DISCUSSIONS WITH REPRESENTATIVES OF THE NRC STAFF

MS. TRAN: Good afternoon. My name is Linh Tran. And I'm the Project Manager with the Division of License Renewal. And this is Hans Ashar. He's a senior civil engineer with the Division of Engineering.

We are here this afternoon to present the proposed license renewal interim staff guidance for the inaccessible area of the BWR Mark I drywell containment shell.

The purpose of this ISG is to provide guidance to future applicants on the information that is needed to be included in the license renewal applications for addressing the inaccessible area of the drywell shell.

Now, the proposed ISG here does not impose any no new technical requirement. And in previous license renewal application review by the staff, we usually can obtain the information in the applications or through the request for additional information. And usually we will get the information from the applicant.

The information provided by the applicant is sufficient for the staff to make its determination. However, it is not the most efficient way because of the RAI back and forth. And in an effort to reduce

the number of RAIs, this proposed ISG would identify the information up front, so for the future applicants, what they should include in the LRAs, I guess, to make the staff review more efficient, information such as inspection results or analysis that would help the staff make the determination whether the containment would perform its intended function for the period of extended operation.

Past operating experience in the Mark I steel containments indicate that when water is discovered in the bottom outside area of the drywell shell, the most likely cause could be the water seeping through the inaccessible area.

And in slide 10 in your handout, I have a picture of the drywell shell. It is an inverted light bulb. That indicates where the inaccessible area would be.

And this area is the area for the distance between the drywell shell -- did you do slide 10?; that's a picture there; yes -- where the surrounding concrete structure is too small for successful performance of visual inspection. That's the area right there. The gap is usually two inches, three inches.

CHAIRMAN WALLIS: You used the term

"seeping." It's really any water that gets there from any reason whatsoever.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And "seeping" is used as a general term.

MS. TRAN: Term, correct.

CHAIRMAN WALLIS: It may not seep. It may actually flow or --

MS. TRAN: Flow through, right.

MR. ASHAR: The area that we are concentrating on is between the shell, between the shell and the concrete in the back, in between the insulation --

MEMBER BONACA: No, no, no.

MR. ASHAR: Oh, I'm sorry. Wrong place.

MS. TRAN: Right. That's --

MEMBER APOSTOLAKIS: It is between what and what?

MR. ASHAR: Between the freestanding steel containment --

MEMBER BONACA: Between the light bulb and the --

CHAIRMAN WALLIS: There's a space right there.

MR. ASHAR: And mostly it is filled with

insulation.

MEMBER APOSTOLAKIS: How does the water get there?

MR. ASHAR: Water gets into -- I'm going to explain. There are three basic sources of water that we have seen so far in the operating history. One can be called because of the -- we don't have any picture of the actual area.

MS. TRAN: No. This is it.

MR. ASHAR: This is it. In this area, there are bellows, bellows between the driver.

CHAIRMAN WALLIS: We saw them this morning.

MR. ASHAR: Yesterday you may have seen it, yes. And those bellows can crack. And then they can give a seepage into the trough, which collects the water.

Now, if the drain, which is supposed to drain out all the water from there, is full or is not working properly, the water can accumulate in the trough area, which has been kept just for that purpose. And it may all flow in coming to this area here.

CHAIRMAN WALLIS: It's lower.

MR. ASHAR: Because it is not showing

better this particular detail, this is not good enough. Yesterday it was a very nice picture here.

CHAIRMAN WALLIS: But in order to refuel, you have to flood the upper region there.

MR. ASHAR: That is correct.

CHAIRMAN WALLIS: And some of that water can get down on the outside.

MEMBER APOSTOLAKIS: Okay. Thank you.

MS. TRAN: Now, in this --

VICE CHAIRMAN SHACK: Now, is that the only source of the water, I mean?

MR. ASHAR: No, no. There are two or three we found so far. Okay? One is a cracking of bellows. Second one is there is a refueling seal between the bottom of the trough, concrete trough. And there is a systematic way of draining it out through a drainage. But drain gets clogged. And the water comes through that area. It collects in the trough again and goes into between the concrete and the drywell shed.

Clog one is the reactor cavity wall. You have a stainless steel liner on it. And stainless steel liner gets -- they may do for any reason. And the water goes directly from concrete into that gap in between the two.

These are three reasons we have identified so far.

CHAIRMAN WALLIS: So what clogs this drain? You said the drain gets clogged?

MR. ASHAR: It is because of negligence on the part of the various --

CHAIRMAN WALLIS: Yes.

MR. ASHAR: -- not to monitor them correctly. Now they have come to their senses. And they started telling us they are monitoring, they are doing this, they are doing that.

MEMBER BONACA: The drains are down from the sand cushions, right?

MR. ASHAR: They are separate. After the water leakage, it is the sand cushion area. Then there are drains to -- actually, those drains were meant for making sure the scent does not go away. And if it is, then they can collect them and put them back the same. That was the whole idea behind it.

But it has been used nowadays as a water-collecting/catching kind of a thing. It is an indirect function of that particular drain, but that shows that water is coming in. If the drains into that room, if it shows any kind of water in the Torus room, then it shows that there is a water leakage from

somewhere up above that is getting into that area.

CHAIRMAN WALLIS: It drains into the room around the Torus? It just drips down the wall somehow?

MEMBER SIEBER: Yes.

MR. ASHAR: The water comes from here.

CHAIRMAN WALLIS: That is a four-inch drain pipe. It just drains down the wall?

MR. ASHAR: This is a sand pocket here.

CHAIRMAN WALLIS: Where does it go to when it drains out of that four-inch drain pipe?

MEMBER SIEBER: Onto the floor.

CHAIRMAN WALLIS: It just drains onto the floor?

MR. ASHAR: Unless they are collectors. Some people have started collecting them into some kind of a jar. But most of them, yes, it was going onto the floor.

MS. TRAN: It goes onto the floor, yes.

MR. ASHAR: There is where they find out.

MEMBER BONACA: Now, some licensees have the drainage and some don't. That depends on the --

MR. ASHAR: Well, some licensees have drains of the sand pocket area here.

MEMBER BONACA: Down at the low point.

MR. ASHAR: Some people have drains at this area somewhere on the top of it.

MEMBER SIEBER: I think all of them --

MR. ASHAR: And if it is on the top of it, then there has to be sealing between --

MEMBER SIEBER: All of them have the top.

MR. ASHAR: -- the concrete and the -- yesterday we saw in the Monticello case, it was a seal, which was a galvanized steel shield between the sand pocket area and the above area. So it prevents the water from getting in.

MEMBER BONACA: The had a few ounces of water, too, at some point.

MR. ASHAR: Yes, yes.

MEMBER BONACA: So they must have come also from the top.

MR. ASHAR: In the case of Monticello, there were no signs like that. We did not see.

MEMBER BONACA: There were only a few ounces of water, they said.

MEMBER MAYNARD: Yes, but they speculated that that water had actually come from another source because of the two or three-inch sand pipe there.

MEMBER BONACA: On the sand pipe there, yes.

MR. ASHAR: They could explain when you ask that question.

CHAIRMAN WALLIS: Well, if it drains down that four-inch drain pipe, I would assume that the sand is full of water.

MEMBER SIEBER: Yes.

MEMBER MAYNARD: Right. That is not the low point.

CHAIRMAN WALLIS: There is a lot of water there before it drains down the pipe. The sand pocket, the sand --

MR. ASHAR: The sand pocket has to be sucked up completely.

CHAIRMAN WALLIS: The sand cushion is saturated with water first.

MR. ASHAR: Right.

MEMBER SIEBER: A number of plants have drains at the bottom of the sand --

MR. ASHAR: At the bottom --

MEMBER SIEBER: It would make more sense to --

MR. ASHAR: Some people have at the bottom of the sand pocket area drains with -- again, actually, it is to retain the sand inside. So that all flowing sand can be collected, but if they can use

it at the --

MEMBER SIEBER: What is the purpose of the sand in the first place?

MR. ASHAR: Okay. See, this is the --

MEMBER SIEBER: Got a cushion?

MR. ASHAR: -- concrete area -- okay? -- here. And this one when the shell expands under pressure --

MEMBER SIEBER: It is room to --

MR. ASHAR: -- it gives you some room to budge in.

MEMBER SIEBER: Expand? Okay. But the whole bottom of the shell sits on concrete? So you don't worry about corrosion below the sand?

MR. ASHAR: We do in some cases. We do to some extent, yes. If --

MEMBER SIEBER: How do you address that? You can't get to it because the top of it is concrete, too.

MR. ASHAR: If there is an appreciable collection of water in the sand bucket area, there is a chance that the water might have gone between the steel shell and the concrete.

MEMBER SIEBER: Right.

MR. ASHAR: But those cases, we have not

found many so far except one, one case.

MEMBER SIEBER: You probably don't know --

MR. ASHAR: Yes, sir.

MEMBER SIEBER: -- you've got a concrete pad, a hemispherical pad, and then concrete above that.

MR. ASHAR: Right.

MEMBER SIEBER: And so there's no way to make a measurement.

MR. ASHAR: We know.

MS. TRAN: The interior.

MEMBER SIEBER: You can't get to the inside unless you cut the concrete out.

MR. ASHAR: Unless you cut the concrete or there are some new methods that have been developed in the NRC's research program, which have guided matters, but they are not yet being calibrated and haven't been used extensively by anybody.

So there are potential uses for those things under these examinations, but we have not seen them use it so far. We have just put one report from Oak Ridge National Lab in e-mail items so that people can look at that report and see if it is applicable for them.

CHAIRMAN WALLIS: Didn't someone yesterday

say they actually made holes in that concrete in order to inspect?

MR. ASHAR: Yes.

MS. TRAN: Monticello.

MEMBER SIEBER: Next to the pedestal.

MR. ASHAR: Yes. They had to do that.

MEMBER SIEBER: But that is about as far as you can go because --

MR. ASHAR: That is as far as you can go right now, right.

MEMBER SIEBER: It's really thick in between.

MR. ASHAR: Yes. You can go up to here in the sand pocket area. Anything below that, if there is a --

MEMBER SIEBER: Of course, the sump is in there, too.

VICE CHAIRMAN SHACK: But typically, though, I mean, your experience is that there is no water there or that they all collect water?

MR. ASHAR: Typically the water has been very little. There has been water except in one case in the case of, I think it is, Dresden III, when they had to put firewater in here to extinguish a fire in the gravel area here --

VICE CHAIRMAN SHACK: Well, that would do it.

MR. ASHAR: -- because of a summation fire. I don't know why.

MEMBER SIEBER: Good place to get a fire.

MR. ASHAR: But there was a fire there. They put a lot of water into it. And this whole area becomes soft here in the sand --

CHAIRMAN WALLIS: I'm interested to see when the sand gets full of water by some mechanism how it ever gets out. How does it ever get dry?

MR. ASHAR: With sand you --

CHAIRMAN WALLIS: If you had water access, suppose the bellows fails --

MR. ASHAR: Except the temperature --

CHAIRMAN WALLIS: -- water runs down.

MEMBER SIEBER: Aren't there drains at the bottom of this thing pushing it, right?

MR. ASHAR: Some have. This one is not shown here. There is a drain right here.

CHAIRMAN WALLIS: There is a drain there?

MR. ASHAR: There is a drain.

MEMBER SIEBER: Okay.

CHAIRMAN WALLIS: So that is how you draw out the sand? You just let it soak out?

MEMBER SIEBER: It drips into where the --

MR. ASHAR: The temperature in the drywell in general in that area is close to about 130-140 degrees. So it helps a little bit drying --

CHAIRMAN WALLIS: It evaporates the water?

MR. ASHAR: To some extent, not -- I mean, I have been given those explanations by various applicants, I know, what does this, but I do not believe everything they say. But --

CHAIRMAN WALLIS: Okay.

MS. TRAN: Slide five, please.

MEMBER SIEBER: You say the space between the concrete and the shell and the drywell is filled with insulation.

MR. ASHAR: Yes, there is insulation in there.

MEMBER SIEBER: What is it, some kind of fiber of some sort?

MR. ASHAR: I think so, yes. In one case we found that insulation was bad enough that it has chloride and all those contaminants. So when the water came in, it came with contaminated water. And that started accelerating the corrosion rate.

MEMBER SIEBER: That would do it. The insulation holds the water all up and down.

MR. ASHAR: Up and down.

MR. GILLESPIE: Hans, I think it is important here that we're not talking in every case about any single containment.

MR. ASHAR: Right.

MR. GILLESPIE: What you have hit on is exactly what I tried to say in the beginning. The specific designs are so variant that we have really found out in doing these reviews that a Mark I containment is not a Mark I containment when you're looking at the drain details and the drain location. It's a function of the age, the AE. And, for example, Nine Mile actually put cameras up to ten-inch drains that they have and looked up in there, and it was dust.

And so before we assume that this thing is always full of water on everyone, there is a great variance between each unit. The design is different. And what licensees have done in the past to verify either the presence or absence of water is very different.

And so it's not like there is a universal answer to each one of these. Each one really is different.

VICE CHAIRMAN SHACK: Now, again, just on

that, are all of the ones filled with insulation or are some of them actually air gaps?

MEMBER ARMIJO: I thought Monticello was an air gap based on yesterday's presentation.

MR. ASHAR: It is called air gap. I mean, in general, the terminology used is air gap.

VICE CHAIRMAN SHACK: But, I mean, is it typically filled with insulation?

MR. ASHAR: Typically it is a concrete General Electric design. It has the insulation in most cases. There might be a plant or two that may not have it available, but there might be some plants.

MEMBER SIEBER: You almost need it to be the form for pouring the concrete.

MR. ASHAR: Right, exactly.

MEMBER SIEBER: You need something in there to do that. Otherwise you don't have a gap at all. And one of the ways you get water down there is you have to take that refueling seal out after you refuel in order to put the drywell back together. And the process of doing that leaves a lip of water --

MR. ASHAR: Right.

MEMBER SIEBER: -- all around where the seal --

MR. ASHAR: Right.

MEMBER SIEBER: -- used to be. It can only go down.

CHAIRMAN WALLIS: Now, we had a plant recently which had bulges in this realignment.

MR. ASHAR: I want to clarify two things. Okay?

CHAIRMAN WALLIS: It was Brunswick.

MR. ASHAR: There is a problem with the terminology. The first thing, when we talk about the drywell shell, it is a freestanding drywell steel shell. And when we talk about the liner, it is attached to concrete with some kind of anchorages.

And that is where we use the word "liner." But I have seen people using very loosely "drywell liner" here. It is not true. Okay? We are going to clarify the terminology in the next -- there is no --

MEMBER SIEBER: The one plant that has the liner, the shell, the structural member is the concrete, the subject of the code.

CHAIRMAN WALLIS: Yes, that's right.

MEMBER SIEBER: So you can tolerate some amount of corrosion as long as you --

CHAIRMAN WALLIS: So the liner just sits on the --

MEMBER SIEBER: -- maintain tightness.

CHAIRMAN WALLIS: Okay. So the liner sits on the concrete, which is why it bulges.

MEMBER SIEBER: Just in that one plant.

CHAIRMAN WALLIS: This one is freestanding, this one.

MEMBER SIEBER: Yes.

MR. ASHAR: The one we are showing is a freestanding shell plus the liner.

MS. TRAN: Okay. Slide five. For some applications, just the information provided was included in the various sections of the LRA. And for other applications, the information was obtained to request for additional information.

As a result, the proposed ISG recommended that future applicants provide a plant-specific aging management program that would address the loss of material for the accessible area of the drywell shell.

So the recommendations that the applicant should be included in there, in the aging management program to develop a corrosion rate that is really inferred from past UT excaination or esatlibsh a corrosion rate using representative samples in similar operating conidtion.

CHAIRMAN WALLIS: I would think the corrosion rate was so low that it would be difficult

to measure. Really, you could say that it's less than a certain amount.

MS. TRAN: Less than, then. No minimum design.

CHAIRMAN WALLIS: That's good enough. You don't actually want them to determine what it is because you might be so low that you can't measure it. But if it's less than a certain amount, that would be acceptable, wouldn't it?

MR. ASHAR: In general, subjection IWE of the ASME code allows close to about ten percent allowance --

CHAIRMAN WALLIS: I know, but --

MR. ASHAR: -- some localized corrosion.

CHAIRMAN WALLIS: But if there is no water there, the corrosion rate may be essentially zero.

MS. TRAN: Correct.

CHAIRMAN WALLIS: And so establishing a zero thing is very difficult to do.

MEMBER SIEBER: Really, what you are trying to do is is to determine how close you are to min wall.

MR. ASHAR: The min wall, right, minimum wall.

MEMBER SIEBER: And by plotting the

reduction in thickness, you can determine when you are going to hit min wall. At that point you no longer meet the code for that pressure vessel.

VICE CHAIRMAN SHACK: How do I do this? Do I have to have multiple UT readings from that inaccessible portion of the shell? Can I demonstrate that mine is always dry?

MEMBER MAYNARD: You could develop a way that you had data from the --

MR. ASHAR: Two in the same location.

MEMBER MAYNARD: If an applicant comes in and they don't have previous data, I'm not sure how they develop a rate.

MS. TRAN: This is what we learned in putting this together. They will have one point at the beginning, you know, the design of the fabrication point. And then as a result of generic letter 87-05, most applicants, I mean, yes, have another data point. So when using that, they could develop some kind of --

VICE CHAIRMAN SHACK: Again, that is very specific. How many data points did they take when they made those UT measurements? How many locations?

MS. TRAN: Eighty-seven? Do you know?

MR. ASHAR: Yes. Generally in response to 87-05, a number of -- now I have to say licensees, not

applicants -- licensees have taken that kind of approach that they will look at four points in four sectors --

VICE CHAIRMAN SHACK: Four quadrants.

MR. ASHAR: -- because they don't remove the sand. They just have the sand. It's not like Oyster Creek. So what they do is they chip out the concrete in certain areas and then take the measurements and in response to 87-05.

And the second reading they take is two years or so after. That gives them a closer rate at the same location. It isn't delicate science that, hey, something is going on. Then they do more work.

VICE CHAIRMAN SHACK: Now, again, from Monticello, they don't seem to have maintained those as access ports.

MEMBER SIEBER: No.

MR. ASHAR: No, they don't. I mean, they can get to it if they have to, but they don't maintain them because they --

MEMBER SIEBER: That becomes another pocket for corrosion --

MR. ASHAR: Yes, right. It becomes --

MEMBER SIEBER: -- because there is moisture inside the containment.

MR. ASHAR: Right.

MEMBER SIEBER: In the sump is actually that floor there. The sump is built into the floor. And so every loose water, amount of water, ends up in that space where the drywell liner and the concrete meet.

So they have to fill it up. They have to do something. Otherwise you would have a pocket of water sitting there.

CHAIRMAN WALLIS: I am still a little puzzled. I would think that the corrosion rate is so low that it's within the uncertainty in the ultrasound measurements.

MR. ASHAR: If it is low, they will report as low.

MS. TRAN: At least we will have --

MEMBER SIEBER: Carbon steel water and --

CHAIRMAN WALLIS: There's no water there.

MR. GILLESPIE: As it happens with real applicants, we're looking at corrosion rates like 17, 18 ml a year in some cases.

CHAIRMAN WALLIS: There is water there.

MR. GILLESPIE: Well, yes. And people are seeing some evidence of corrosion. In another case, Nine Mile case, they did these measurements. And then

they have a high-corrosion area on mild carbon steel at the water line in the Torus.

And what they did was they took that rate as a conservative estimate, where they know water is, and applied it to their liner and say, "Okay. We've got 38 years to go here."

And so people actually have come up with ways given these points and other representative carbon steel areas within their area that they do measure because they're in harsher environments and applied that as a representation to this in order to show that they could make it past the renewal period or at least until the next measurement that they might commit to take.

And so so far each licensee that we have had an opportunity to both finish our review or interface with so far has actually been extremely consistent with this position. And so they have actually figured out how to do it.

And there is other carbon steel in the Torus, actually in a wet environment, which gives you a noticeable rate, as it happens, particularly where some of the liners have blistered and bubbled, which is a whole other issue, that they can apply to this.

It's a conservative application. You

know, if it doesn't work, then they have to do something else to convince us that the rate is okay.

So when we talk the nebulous philosophy, it gets harder, but I think when you get to specific plant situations, pardon the pun, but it's concrete. And so they have kind of come up with ways to use the generic point, the generic letter issue points.

In fact, in Vermont Yankee's case, they actually had leakage and did extra measurements consistent with the ISP, which wasn't issued when they did this some years ago. And so they have preserved those extra points.

And so it just happens that these plants actually have this information sitting there. They just haven't used it in this application before. And this is clarifying. We expect you to use it in this application.

Go ahead, Linh.

MS. TRAN: I guess now where degradation has been identified in accessible area of the drywell, meaning in the interior area of the drywell, the applicant should provide an evaluation that would address the condition of the inaccessible area of a similar condition or find something in the interior area. They should have an evaluation for that.

Now, to assure --

MEMBER APOSTOLAKIS: How does one do that?

MR. ASHAR: Let me. The actual, this is just what we have seen.

MEMBER APOSTOLAKIS: That's okay. You don't have to show it.

MR. ASHAR: Okay. This is the requirement we set in after when we endorsed IWE, IWL into 50.55(a) in the rule, that if they find something in the accessible area, they ought to go and look in the surrounding inaccessible area to see if there is anything going on.

A lot of PWR licensees, for example, have found that at the junction of the steel liner of the concrete containment and the concrete floor, they have moisture barriers generally. And their moisture barrier gets damaged. The borated water many times go in. And it starts corroding the inside area. It shows up a little bit on the upper side.

So they would do examination and find out what is going on. And they find the moisture barrier could be the culprit. They have to change the culprit. They ought to go inside. They ought to take out the corrosion.

So that's the reason this problem has been

in about the inaccessible. In accessible area you have corrosion. You would look into the joining inaccessible area to find every --

MEMBER APOSTOLAKIS: You will look into the inaccessible area. That helps make it accessible or not?

MR. ASHAR: No. If you see some rusting or something on the --

MEMBER APOSTOLAKIS: You can look at it. Why isn't it accessible?

MR. ASHAR: No, no. The whole area is that you see something in an accessible area. And they investigate as to what is going on underneath that particular area. The basic focus in the room was the PWR containments. That is where it was found in so many of them. And still we are finding it.

MEMBER ARMIJO: But it is possible you could have damage occurring in an inaccessible area and have nothing in the accessible.

MR. ASHAR: That's quite right.

MEMBER SIEBER: Possible.

MR. ASHAR: That is why this type of --

MEMBER ARMIJO: Very possible. I mean, it's --

MS. TRAN: That is why we use accessible

area as the indication for the accessible area for the augmented inspection. They have to do visual in the surface. And then if the surface area is accessible only from one side and they have to protect the wall thing by using ultrasonic --

MEMBER ARMIJO: I don't worry about the accessible. I just worry about the inaccessible and having no way of knowing just by looking at the accessible area. It's not a good --

MR. ASHAR: That is where this ISG kicks in because this ISG is focused on inaccessible area. This is one of the pointers, that if there is something going on in the accessible area, which you can see right away, then there is something going on and you will look at it.

MEMBER ARMIJO: That is the easy part.

MR. ASHAR: The ISG concentration, focus of this ISG, is the inaccessible areas.

MEMBER APOSTOLAKIS: But how does one suspect?

CHAIRMAN WALLIS: Yes, that's right. How does one suspect?

MEMBER APOSTOLAKIS: How do you suspect?

MS. TRAN: You find water or leakage on your --

MEMBER APOSTOLAKIS: That is getting back to what Dr. Armijo is saying. That's not our worry. What if you don't find water? You still make some problem in the inaccessible area. Is that correct?

MEMBER ARMIJO: Yes, you could.

MEMBER APOSTOLAKIS: So how does one suspect that something is going on in the inaccessible area?

MEMBER BONACA: No. She says water.

MS. TRAN: Water is one. If you find water in the drain lines, water in the drain line, in the --

MEMBER BONACA: For example, if the seals -- I guess you are focusing on the seals and on the bellows, right?

MR. ASHAR: Right.

MEMBER SIEBER: The only way you can get water into the inaccessible area is to have it flow through the accessible area. So if you make a measurement in the accessible area --

MEMBER APOSTOLAKIS: Okay. That is a different --

MEMBER SIEBER: -- that gives you some kind of justification to extrapolate to the area you get.

MEMBER APOSTOLAKIS: But that doesn't help much because it could have run down --

VICE CHAIRMAN SHACK: The water runs down and collects at the --

MEMBER SIEBER: Right.

VICE CHAIRMAN SHACK: It doesn't stay on the side of the --

MEMBER BONACA: That is why the real focus is the last bullet. And that's what they attempted to do, you know, to put in the seals and the bellows in the scope of license renewal. And this has been kind of debated with the industry.

CHAIRMAN WALLIS: This is a very weak statement, "if moisture is suspected." That's a very subjective --

MS. TRAN: Or detected.

CHAIRMAN WALLIS: If you have a suspicious nature, you would suspect it all the time.

MR. ASHAR: Subsection IWE in its IWE-1240, there's a number of items. This is the abbreviated form. A number of places where this could occur is very vividly described in there, IWE-1240 in the ASME code. And that is what we are invoking, but we did not write everything that is written in the IWE-1240.

MEMBER APOSTOLAKIS: Now, you are really including SSCs that are identified as source of moisture and scope, source of moisture?

MR. ASHAR: Yes. For example, cracking of bellows.

MEMBER SIEBER: The refueling seal.

MR. ASHAR: I explained to you earlier.

MEMBER APOSTOLAKIS: Okay. That's what --

MS. TRAN: The refueling seal is not.

MR. ASHAR: Refueling seal.

MS. TRAN: So they have to put that in the scope of license renewal.

MR. ASHAR: This is what we are --

MEMBER APOSTOLAKIS: Okay.

CHAIRMAN WALLIS: Why don't they just require that they check the bellows for cracks routinely?

MR. ASHAR: It is not very easy to get to it. They can do tests. That's what they do most --

MEMBER SIEBER: It not the only place it can leak.

MR. ASHAR: Yes. And I say --

MEMBER SIEBER: They can leak along the edge.

MR. ASHAR: Yes. And this is what we want

to have them in the scope of license renewal, so they maintain them in a condition where it is not leaking.

MEMBER MAYNARD: Well, by "suspected" here, don't you really mean if there has been some previous evidence that moisture has been there? You know, I suspect. I have a hard time dealing with what I might suspect, but I can deal with whether I have had any indications or evidence.

MS. TRAN: Yes. This is "suspect" or "detected" through your drain lines.

CHAIRMAN WALLIS: Well, if moisture is detected, now, that makes sense.

MEMBER MAYNARD: Yes.

MS. TRAN: It should be "detected," instead of "suspected."

VICE CHAIRMAN SHACK: So if moisture has been detected any time in the life of this plant up until license renewal included? Is that what it says?

MEMBER APOSTOLAKIS: It is not really detected. Go ahead. You answered my question.

CHAIRMAN WALLIS: Well, just take out the "if" clause and say, "include."

VICE CHAIRMAN SHACK: Yes. Why not just include them?

MEMBER APOSTOLAKIS: I think "suspected"

is broader because would that include a situation where you have seen moisture or water in a similar facility and you suspect it may happen in yours, even though you hadn't seen it? "Suspected" is broader.

MEMBER MAYNARD: Well, yes, but I think from a regulatory standpoint and from dealing with licensees, I think you need a little bit better definition rather than it just being somebody's opinion sitting there saying, "Well, I suspect there might be something there."

CHAIRMAN WALLIS: Suspected by whom? Inspector or is it --

MEMBER MAYNARD: Well, I like the "detected" or --

MS. TRAN: Detected. I think --

MEMBER BONACA: We had a discussion yesterday at Monticello that shows how difficult the issue is. I mean, we rely very much on subjective judgments and say, "Well, we don't think we ever had water."

CHAIRMAN WALLIS: You could simply say that "The ACRS suspects that there may always be water there. Therefore."

MEMBER APOSTOLAKIS: You guys must have had a hell of a meeting yesterday.

VICE CHAIRMAN SHACK: In Monticello's case, they see no evidence of corrosion in '87, which was a fairly substantial operating period for them.

MEMBER APOSTOLAKIS: That's right.

MS. TRAN: Identified.

MEMBER ARMIJO: If they have good records, they have a good sound --

VICE CHAIRMAN SHACK: One data point.

MR. ASHAR: We have to draw things --

MEMBER ARMIJO: They don't have to do it.

MS. TRAN: So just to get back on --

CHAIRMAN WALLIS: You really fixed this up.

VICE CHAIRMAN SHACK: Why not just put these seals in scope and be done with it?

MR. ASHAR: This is what we tried to do earlier. And there is so much resistance from a number of applicants. I mean, I had to go to three or four RAIs over and above a lot of teleconferences to convince them to put this in the scope of license renewal. And so many people denied.

CHAIRMAN WALLIS: So now you have to convince them to suspect something?

MR. ASHAR: No. Now, with this ISG, if they have suspected sites, areas, then --

CHAIRMAN WALLIS: But they don't want to do it anyway. They'll never suspect anything.

MEMBER APOSTOLAKIS: No. Presumably there will be some guidance what suspicion means.

MR. ASHAR: There is a guidance.

MEMBER APOSTOLAKIS: Yes.

MR. ASHAR: There is.

CHAIRMAN WALLIS: There must be.

MEMBER APOSTOLAKIS: It just doesn't say it in bullets.

MS. TRAN: Yes.

MR. ASHAR: I was looking for IWE-1240 here. I don't have one.

CHAIRMAN WALLIS: Okay.

MR. ASHAR: But that is where it is fully described as to -- this is what we are invoking here basically.

CHAIRMAN WALLIS: You want to say something, "if there are indications of moisture" or something like that.

MR. KUO: If I may, Part 54 rule in the rule language in the SOC discussed this, saying if a component is in an environment that could have aging effect, say in the operating experience, anywhere in the industry or your specific plant, that there is

such a degradation mechanism, degradation mechanism that could cause an aging effect, then an aging management program should be provided. That's what the Part 54 rule requires.

In other words, if this is a possible aging effect from the operating experience, then that is suspected. You would use the word "suspect." That happened before. We should not talk about the hypothetic aging effect, but it is an aging effect that we have seen before.

VICE CHAIRMAN SHACK: Right. That is why I can't understand why you can't just put the seals in scope. I mean, it's not a hypothetical event.

MR. KUO: Like Hans said, some people don't want to include the seal in the scope.

CHAIRMAN WALLIS: There are often people who don't want to do things, but you can say, "Do it."

MEMBER BONACA: What you want and what you get are two different things.

MR. GILLESPIE: I think you will find as a result of this ISG, fundamentally seals are in scope. Remember, seals and the refueling stuff are not safety basically. And so what we're doing is because of the effect of non-safety components on a safety component, we're bringing them into scope. So

it's a bit indirect.

And so it shouldn't be a surprise that utilities don't want extra requirement on things that don't have any requirements on them now.

MEMBER BONACA: But, you know, one thing that we are learning from this license renewal process as we converge, it seems to me that the central issues are becoming the inaccessible or buried components that you can't look at, that you cannot measure. And that's natural because, I mean, these plants are going beyond some original design in certain components of the -- and I think that it is important that we focus on these inaccessible components and ask our questions, you know, how long can this live and what is the source of the problem. And here -- anyway --

MS. TRAN: Hans wanted me to read the IWE-1241, the examination surfaces, "Surface area for the typical location," "Typical location of such areas of those exposed to stand-in water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulations, condensation, and biologicals attack." I mean, it is in the -- it tells the applicant the area.

Now, let's say if moisture is detected as suspected or identified --

(Laughter.)

MS. TRAN: Now, we will agree that they found water. Okay? So they should include the component, the source of it, in the scope of license renewal. In addition, we need to identify the surface area.

Next slide. By implementing and augmenting inspection for the period of extended operation in accordance with the ASME section 11, subsection IWE and also for the examination shall be in accordance with section 11, subsection IWE-2500. And I did go over that a little bit earlier.

That means that surface area accessible from both sides should be visually examined and surface area that is only accessible from one side should be examined for wall thinning and using sonic thickness measurement method.

Now, after all of that, after all of the augmented inspection, the applicant should demonstrate that either corrosion is not occurring by performing those examinations or analysis to do analysis on the result or that corrosion is progressing so slowly that the age-related degradation will not jeopardize the intended function of the drywell to the period of extended operation.

VICE CHAIRMAN SHACK: Just how thick is this light bulb again?

MR. ASHAR: The light bulb? It varies. From the top, it is thinner, very thin, right around half-inch to three-quarter-inch. As you go down near the knuckle area between the sphere and the upper part, it is spherical area. It is close to about .7, .6 inches. Then it again goes down up to six inches. And then at the bottom area is about one to one and a half inches in between the sand pocket area --

VICE CHAIRMAN SHACK: No. But, I mean, it's 17 ml a year.

MR. ASHAR: Oh, yes.

VICE CHAIRMAN SHACK: You're going to chew that at a pretty good clip.

MEMBER BONACA: If you find a hole in the liner, I mean, would you suspect some moisture there? I mean, what is --

CHAIRMAN WALLIS: Even my chassis of my car, which is soaked in salt, doesn't corrode at 17 ml per year, does it? It's really bad conditions if you've got --

MR. GILLESPIE: Yes. That actually is the two worst points that a particular --

CHAIRMAN WALLIS: Yes, very bad --

MR. GILLESPIE: -- that they reported to us. What it does do, though, is say there is operating history out there in this utility environment, that we cannot take for granted that it can't happen.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And that's the reason for the ISG. We are not going to make the assumption because we have operating history that says it's not necessarily a valid assumption in all cases that it's going to go slow. There has been evidence of this going faster than people would have originally anticipated in the designs.

MEMBER BONACA: But in some cases where we have questioned the bellows, particularly the seals, if you're in seals, then the answer is always, well, we have good drainage. So you are in a quandary. I mean, what leads you --

MR. ASHAR: There are a number of things that tells us. The first thing, the drains are not clogged any time in the past. The second thing, visual examinations performed in the areas, it was shown there are no telltale signs of water for a number of inspections there performed. Then they had to show us at the bottom in the drain line there was

no water coming out anywhere.

So there are so many things that they would tell us before they convince us that there is nothing going on.

MR. GILLESPIE: Mario, I would also say that I think this came up in Monticello's case yesterday, --

MR. ASHAR: Right.

MR. GILLESPIE: -- where they didn't take credit for it, but they actually had a primer sprayed on the outside of the inaccessible area. And other licensees have different applications of codings on it also.

And so it's not one thing.

MEMBER BONACA: Yes, I know, but --

MR. GILLESPIE: Aging management is accumulation of codings, time of exposure, amount of water.

MEMBER BONACA: And the spray on the surface was 65 or 40 years ago practically, 1965. So, you know, right. I understand.

MR. GILLESPIE: But the environment is not such that there is anything in there to actually cause the paint to peel off either. So there's no one issue here.

MEMBER BONACA: Yes. I understand.

MR. GILLESPIE: It's different pieces to try to give you reasonable assurance.

MEMBER BONACA: In fact, yesterday at the end of the conversation, it was the lady who was performing the inspections felt confident with that. I'm sure that if you go physically and look at it and get information, you know, you can build a credible case that there is no concern with moisture. So I accepted that yesterday.

MEMBER ARMIJO: But a case has to be made --

MEMBER BONACA: Yes, it does.

MEMBER ARMIJO: -- with documented data, not just --

MEMBER BONACA: Right.

MEMBER MAYNARD: Is there something that is done periodically to ensure that these drains are really open, like particularly the sand point drains and stuff, that they're not plugged in some way?

MR. ASHAR: Now they are committing to those things. They have ensured those things, yes.

VICE CHAIRMAN SHACK: You'll find out when you have a leak.

MEMBER SIEBER: A sand pocket drain is a

four-inch pipe. So they're hard to plug.

VICE CHAIRMAN SHACK: Yes.

MEMBER BONACA: I believe we have also some comments from the industry.

MS. TRAN: Right. Yes.

MEMBER BONACA: So shortly we'll get to those.

MS. TRAN: I am almost done. Now, if the intended function of the drywell cannot be met, the applicant can identify actions that will be taken as part of the aging management program to ensure that the integrity of the drywell would be maintained through the period of extended operation.

Last slide. Now, the drywell shell concern has already been addressed for the reactor's initial 40 years' licenses and relevant plants that have received a renewal license, as indicated in the left column there.

Now, the staff is in the process of reviewing the plants in the middle column. And the third column represented the remainder of the plants with the Mark I steel containment design.

Not all the plants in the third column, however, have announced their intention to renew their license, but the future review that's listed on the

right side.

This concludes my presentation. So we can entertain any additional questions that you might have.

MEMBER BONACA: You don't have to request questions.

CHAIRMAN WALLIS: Ell, I suspect there might be some more questions.

(Laughter.)

MEMBER SIEBER: I don't know what they would be that we haven't already asked.

MEMBER BONACA: Any additional questions?

(No response.)

MEMBER BONACA: None. So we thank you for a very good presentation.

MS. TRAN: Thank you.

CHAIRMAN WALLIS: You have been here all day, Alex.

MR. MARRION: I know. Can I get one of those little name tag things? I'll just put it on.

(Laughter.)

MR. MARRION: Good afternoon. My name is Alex Marrion. I'm Senior Director of Engineering with NEI. And with me I have James Ross, who is the senior project manager with lead responsibility for license

renewal. He's here to keep me out of trouble. He should have been here earlier.

I just want to make a couple of general comments. Based upon comments that the NRC made about the uniqueness of the specific plant designs, we feel that this is not really a generic issue, but it's appropriate to address it on a plant-specific basis in accordance with the uniqueness of the designs. And I think Frank Gillespie brought that up.

This is not a new issue. It's been addressed by the licensees in the past. There was a generic letter, 8705. And inspection requirements were incorporated into NRC regulations when NRC endorsed the ASME code subsection IWE as part of an update of 10 CFR 50.55(a).

Because that was already regulatory requirements, utilities were resisting the idea of imposing an additional regulatory requirement given that there wasn't sufficient evidence to indicate that the current requirement was not adequate if that makes sense.

The particular interim staff guidance is out for comment. Right now comments are due the 8th of June. We intend to submit comments on behalf of the industry.

Most of the comments will be of a clarifying nature to make sure we understand the language, et cetera, which brings me to a more generic communication process issue. You know how I feel about generic communications based upon comments I made earlier.

The one thing that is not clear to us as an industry is why there is a need for an ISG process to begin with given that the NRC already has a well-established generic communication process that could be used as a vehicle for communicating staff guidance going forward.

So now we have generic communications. And we also have interim staff guidance, two separate processes that basically overlap. So we're going to continue making that point with every opportunity we have.

Lastly, I understand some question has been raised about the idea of continuing or the idea of imposing ultrasonic testing requirements. I want to make it clear that the current requirements that we currently have are for a graded approach to a visual examination.

And depending upon what you find, you do a more comprehensive examination, but the first step

is a visual. And that's basic --

CHAIRMAN WALLIS: How do you visually inspect these inaccessible areas?

MR. MARRION: Well, as you heard from the staff, you do an examination of the inaccessible areas based upon what you find of the accessible areas if I have characterized it properly in what the staff was proposing.

And for the Mark I's, we intend to continue that process going forward. And we will be commenting accordingly on the ISG comments.

CHAIRMAN WALLIS: You have to be able to access some place which is relatively typical of the inaccessible places in order to do that.

MR. MARRION: Yes. I'm not familiar with the details of what that is, yes.

That's all I have, sir.

MEMBER ARMIJO: I just think that is fundamentally unsound because you have, really, a crevice condition in that sand pocket area. It's not at all represented by the accessible area.

And so looking at a safe location to make a judgment of a susceptible location seems to me a waste of time. I mean, if the accessible area is highly corroded, you can be sure that the inaccessible

is in bad shape.

MR. MARRION: Right.

MEMBER ARMIJO: But the converse isn't true.

MEMBER APOSTOLAKIS: But didn't Jack say that for the water to get to the inaccessible area, it has to go through the accessible areas?

MEMBER ARMIJO: Yes, but it doesn't stay there.

VICE CHAIRMAN SHACK: It doesn't stay there.

MEMBER ARMIJO: It flows.

VICE CHAIRMAN SHACK: You have got a drain right at that thing. I mean, there is no way for water to really accumulate --

MEMBER APOSTOLAKIS: It is not accumulating.

VICE CHAIRMAN SHACK: -- in that accessible area.

CHAIRMAN WALLIS: But it gets to the sound --

MEMBER APOSTOLAKIS: But you are going to see some moisture or something.

MEMBER ARMIJO: You can make a case that if it's always been dry, that's your best case. You

have good data.

MEMBER MAYNARD: I thought part of that, it would depend on what you include as a visual area for what you base -- if you're including the drains and if there is any moisture coming out of the sand drains or anything like that, well, that might be appropriate. But if you're saying that all you have to do is just visually look at the inside of the container there, that you don't have to do anything else.

But if you include as part of what you find visually results of drains and other things --

MR. MARRION: That is a comprehensive examination requirement that's in 50.55(a) right now.

Thank you. And I appreciate the time I spent with this illustrious body today.

(Laughter.)

MEMBER KRESS: We are honored to have you.

MEMBER BONACA: If there are no further questions, first of all, I want to thank the staff for their presentations and for the information. And then I'll turn the meeting back to you, Chairman.

CHAIRMAN WALLIS: Thank you very much.

We are finished with our formal presentations for the day.

MEMBER KRESS: We don't have a letter on this particular issue?

MEMBER BONACA: No.

MEMBER KRESS: This was just a briefing?

CHAIRMAN WALLIS: Just a briefing. It was just a briefing.

MEMBER BONACA: There is no impact because, I mean, it was helpful because, again, yesterday we had a --

CHAIRMAN WALLIS: We don't need that --

MEMBER KRESS: Are we going to give some feedback now or anything on what we've heard or do you think the questions are sufficient?

VICE CHAIRMAN SHACK: The questions were sufficient.

CHAIRMAN WALLIS: Unless you have another point you want to make. Do you want to make some point?

MEMBER KRESS: Well, my point was that I just don't like this round-about way of doing things in the sense that I think there's a fatal flaw in trying to use the accessible areas to determine whether or not there is a problem in the inaccessible areas.

I would do what Bill Shack just said. Why

not just include those sources of moisture within the scope?

VICE CHAIRMAN SHACK: Well, I think --

MEMBER KRESS: I know it has been resisted by the industry, but it doesn't seem like that big of a burden to me. I think that's the real solution. And that's what they're after, but they're trying to do it in a round-about way.

VICE CHAIRMAN SHACK: I also think a techie could come up with a way to measure those thicknesses.

MEMBER KRESS: Show me that way, and that may be okay. That's possible.

MEMBER SIEBER: Well, when you put the refueling seal in the scope, all you're doing is establishing an aging management program for that. That doesn't prevent leakage necessarily because there may be something other than the aging that causes the leaking.

MEMBER KRESS: Okay. Maybe. Maybe I am flawed.

MEMBER SIEBER: You could twist it, and now it leaks.

CHAIRMAN WALLIS: You should probably inspect a more susceptible area, which is a sand

pocket.

MEMBER SIEBER: I think you have to deal with the --

MEMBER BONACA: In the past we left it to the --

MEMBER SIEBER: -- rather than deal with something that is removed from it.

MEMBER BONACA: In the past we left it to a licensee to have a choice. For example, in Browns Ferry, the staff was asking for inspection of the seals. They fought that. We left them open, either that or UT the liner in the vulnerable locations. And they chose to UT the liners.

The burden is inaccessibility because there is going to be that every ten years. And when they do the ISR, they are in containment. And they physically can then perform most of the utilities in those locations. So we left open those possibilities.

I take your point, and I think the Committee should decide. Should we have a comment on this or -- the intent wasn't one of providing a letter. This was an informational presentation, but --

CHAIRMAN WALLIS: I think the staff has heard our comments. It was a preliminary sort of

thing. And that is probably good enough for now.

MR. GILLESPIE: We appreciate the comments because, as Mario said, underground cabling, piping, and this kind of large passive component are really becoming kind of the end point. Everything else we know how to deal with for the most part.

But I will say in this case -- and let me take Browns Ferry. You might say, well, why did Browns Ferry choose UT versus the seals. Browns Ferry actually had unidentified sources of leakage. And he said versus trying to identify every source of leakage because they didn't know where it was that their cheapest way out was actually to do the UT.

But they got the idea that we wanted to wait. And you had to assure us this thing was going to be okay relative to thickness.

VICE CHAIRMAN SHACK: That sand pocket is pretty big. I mean, you can have a fair amount of moisture in there that you're never going to see coming out of those drains. And, yet, you could have attack over a reasonable fraction of that.

MEMBER SIEBER: There are oodles of surface in there for the moisture to collect on.

MR. GILLESPIE: But, again, the locations of the drains are plant-specific. Some plants have

seals, as Monticello had over it. Some places have a liner or coding on the other side of the surface.

VICE CHAIRMAN SHACK: Well, a bottom drain would give me a whole lot more comfort than that top drain would.

MR. GILLESPIE: Yes. The other thing is the sand is very compacted.

MEMBER KRESS: Have you ever tried to drain moisture out of the sand from the bottom? It doesn't come out.

MR. GILLESPIE: I don't want to pooh-pooh it, but the idea that this is a 130-degree area also --

VICE CHAIRMAN SHACK: You drive it out with --

MR. GILLESPIE: And so you're going to drive it out. And so you've actually got the occasion to get water in there about 20 days every 18 months or 24 months depending on the fuel cycle someone is on and how long it's flooded. And that's why we've started to key into visual. You might say, visual leakage from someplace kicks you into needing to do a UT.

Now, what this inter-staff guidance position does do is says the identification of

moisture, basically leakage, is equivalent to the visual recognition of accelerated corrosion on the inside. And that's an important distinction, which never existed before.

So for the inaccessible areas, we're using the indirect indication of seeing water as kind of an assumption that you have to do the same thing as if you saw accelerated corrosion on the inside. That gets us a measurement on an event basis.

And so someone who is sworn to keeping this thing dry, if they have an event during a refueling where they get leakage in there, now they're obligated to do something which is a bit more onerous and reestablish their rate.

It's not perfect. By the way, there are two inaccessible areas. We should be clear on that. There is the inaccessible area in the air gap. And then there's this inaccessible area that's layered on the bottom between the two concrete layers, which is really probably the most difficult area, but it was designed to last 40 years. It is totally lined with concrete. And then you've got this temperature gradient.

CHAIRMAN WALLIS: Is 40 years good enough with license renewal, though?

MR. GILLESPIE: Now, it was originally designed for 40 years, but that was kind of an assignment. But now if you have no evidence of in leakage or water in there, I mean, again, it's indirect stuff. It's almost like a circumstantial case we're acting --

CHAIRMAN WALLIS: Concrete is not dry all the time.

MR. GILLESPIE: Concrete is porous material, and it is not dry all the time. And so then you could ask questions. A fair question in the aging management program is, what are you doing about groundwater? And do we have any evidence of groundwater?

We asked that from Nine Mile. And I think we're coming. I signed up the draft SE this morning. So I think next month we're probably coming on Nine Mile. They have actually got alarms on their drains if moisture is detected.

So every plant is doing some unique things.

CHAIRMAN WALLIS: Moisture can come out of the concrete. There is a lot of concrete. There is a late curing of the concrete which goes on for a long time. Then it can be damp. It doesn't have to be

very damp --

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: -- to produce some chemical reaction.

MR. GILLESPIE: What is the impact? This is what I don't know, is what is the impact of this temperature gradient.

CHAIRMAN WALLIS: You don't have oxygen. So that is probably what protects you.

MR. GILLESPIE: And so there is a number of things that -- we're doing our best, appreciate the Committee's comments, and more than happy. If anyone else has any better ideas, we would love to have them, but this ISG was an effort to send a benchmark for basically the best-performing plant on liners.

It has no moisture. What if you get moisture? How do you establish your rate? This is kind of putting out, in essence, that they now know we do expect a rate to even be established. We didn't have that in writing before.

CHAIRMAN WALLIS: We won't comment on it, and we hope it works out.

MR. GILLESPIE: Well, feel free to comment on it. We're happy to have comments. NEI is going to feel free to comment on it.

CHAIRMAN WALLIS: We won't.

MEMBER BONACA: Certainly we will comment on individual applications.

MR. GILLESPIE: Yes. I do think this is middle ground we are wrestling with here because I do agree with Alex that the individual designs that we're applying this concept to are significantly different. In critical questions, like locations of drains, some are going to be more susceptible than others.

As I said, Browns Ferry said we have unidentified leakage. We know we have leakage. It's not a lot. UT is our answer. It's the only way that could give us positive confirmation.

CHAIRMAN WALLIS: Have they been having leakage on their reactor which has been shut down for all that period of time, unidentified leakage?

MR. GILLESPIE: Well, remember, we license units I, II, and III. The floor wasn't flooded on 1. So they haven't had any leakage on I for a long time.

CHAIRMAN WALLIS: They think they haven't. They could have an unidentified leakage.

MR. GILLESPIE: They had some unidentified leakage from refuelings in the other units, and they chose UT.

MEMBER SIEBER: They have them for fuel

for --

MR. GILLESPIE: By the way, this is a very high-dose area, too. And so the question here isn't money.

MEMBER BONACA: Not only they. I mean --

MR. GILLESPIE: It's going to be dose.

MEMBER BONACA: Where the seals are, it's a very high red area.

MR. GILLESPIE: Yes.

MEMBER BONACA: Not down in the sand pocket.

MR. GILLESPIE: It depends on where you're at. You're directly under the vessel.

CHAIRMAN WALLIS: No one is going to go down there.

MR. GILLESPIE: My understanding from the licensees is from a radiological perspective, this is not an area you want to take lightly doing extra measurements over and above what you really need to confirm your --

CHAIRMAN WALLIS: BSBWR has hatches that you go in into the reactor pedestal area.

MEMBER BONACA: We were told by TVA that it is not a high red area because it is well below the --

MEMBER KRESS: Graham, I was wondering if the staff is considering a user need letter to Research to try to develop a way to do this more definitively, maybe strong on ultrasonics or something. Is there such a user need letter or any --

VICE CHAIRMAN SHACK: Well, there is something from Oak Ridge now.

MR. GILLESPIE: Actually, there is a letter report that just recently got put in ADAM from Oak Ridge, from a project that Research sponsored, but it is not commercially available yet. And, as best I understand it, it is a technique to calibrate for this concrete steel concrete sandwich.

I think, as I understand it, there are three different alternative approaches to doing it. And so the information is starting to be developed and published. But we're probably years away from actual commercial application to go from the research bench to the --

MEMBER KRESS: Yes, but you have got years to go to do it in. I mean, the corrosion rate is low enough that --

MR. GILLESPIE: I am not disagreeing. If the Committee would like to -- we think we're actually pretty close right now on a plant-by-plant basis. But

if the Committee would like to write a letter recommending a research project, it's okay. I don't mind. It's your Committee.

MEMBER SIEBER: The question is what do you want to cut out to pay for it.

MEMBER MAYNARD: I would like to just add on to Tom's previous comment just a little bit. It doesn't surprise me. And I would expect the industry to resist new requirements, new changes to things. I think it better to get the fight over, have it once, rather than a lot of times.

So, rather than dealing with a lot of things through staff guidance, generic letters, a lot of times it would be better if this is going to be a new expectation, new requirement, let's follow the process and make that -- you know, get the fight over with once, make it happen, rather than continually trying to go around these systems just generically.

MEMBER SIEBER: The requirement has always been there. And it stems from the code requirement. The question is, what do you do and how do you do it to give yourself a reasonable assurance that you're okay.

MR. GILLESPIE: The new aspect now is people having to articulate in an aging management

program what they're going to do to ensure that their monitoring and measurement process for this liner will detect its approach to minimum wall thickness prior to it getting there.

I mean, that's really what plant license renewal is, to ensure that you have the additional monitoring programs in place that you will detect and correct prior to exceeding that minimum wall thickness.

The discussion of this ISG between us and the industry is evoked. I think it has now gotten us to a point where we have some actual cases under our belt that have now, you might say, set the standard for the next ones to come in.

And now we've got each plant evaluating itself against the plants we have already looked at and saying, "Am I like them? Am I different? If I'm different, then is it a positive difference or negative difference?"

And now we're starting to get those kind of aging management considerations into this piece of equipment, which we did not have, quite honestly, going in until we hit Browns Ferry.

The Committee wants -- Mario will remember this. I forget which BWR they were in. It was on the

steam dryers. And I used the Committee. I quoted the Committee to the staff on the liner. And it was on the dryers.

And, Mario, I forget. You might have been the one who said it. You said it's large, it's passive, and you just wrote a generic letter saying it's safety. It wasn't in scope before that statement was made. It's now in scope. And, you know, the staff said it's large, it's passive, it has corrosion, and it's safety. And so now we're trying to take it on head on. I think with some success, you're seeing the applications getting it addressed at some level of credibility now.

MR. THADANI: Graham, I have one quick question.

Frank, you noted this is a high-dose area. This issue is one important in many ways, has I think rather minimal risk to public. How is that sort of balanced in terms of the actions called for and its relative importance?

MR. GILLESPIE: I think how we are trying to deal with that -- and we have got a meeting with one applicant day after tomorrow, Oyster Creek, on this, on our residual concerns after their RAIs. And, really, what we started talking about was the

uncertainties involved in the decision.

And so the question really is, how much should you pay for certainty in a decision? Because the significant measurement uncertainty and doing these UT exams, they're actually fairly coarse.

There is uncertainty in primers and liners, which have exceeded, basically, the manufacturer-recommended lives of 10 to 15 years. Yet, they're still there. And they're still being inspected doing what they're doing.

There is uncertainty in have you picked enough selected locations because we are looking for a general area degradation. We're not looking for just pitting.

The Committee didn't mention it, but there are really two concerns. One is pressure retention and accident. And the other is buckling, the sheer collapsing of this thing under its own weight. And so you've got two reasons to inspect two different areas.

And so I would suggest that in this ISG and what we're seeing from these utilities, we're actually accepting, you might say, a fair level of uncertainty in it to keep it rational.

And so the safety consideration is in how much do we want to press people to make it more and

more certain. And so that's really how we're factoring in the safety significance of it.

When I talk about dose and how many measurements need to be taken, we need reasonable assurance. And in many cases, there's not positive evidence on either side because this is a large passive thing that was put in there. It's expected to last forever fundamentally from the designer's point of view. We're confirming that assertion.

CHAIRMAN WALLIS: It probably will in most plants last.

MR. GILLESPIE: In most plants, I think it will. And so it's a confirmation. And so we're not designing the plant, which is very vigorous. We're confirming that the expected performance will be sustained. And we probably can be slightly less rigorous in the uncertainty we accept on that.

CHAIRMAN WALLIS: That is all the agency ever does. It doesn't design plants.

MR. GILLESPIE: Right.

CHAIRMAN WALLIS: It confirms performance.

MR. GILLESPIE: But you learn how much, what you're going to do in that confirmation.

MEMBER BONACA: Yes.

CHAIRMAN WALLIS: I think we may have gone

over. We have gone over 15 minutes. I think it's about time we --

MEMBER BONACA: One last comment I had was that, you know, so many of the -- however the inspection processes we still depend on, for example, the visual inspection of this, we are still at the pace that really was conceived at the moment these plants are put in renewal. Okay? So every ten years they go in and look at it. Okay?

To me, you know, as these plants get older and older, these inaccessible areas, et cetera, you know, then maybe the frequency with which we're looking at it becomes more questionable because, you know, every ten years, a lot of things can happen.

CHAIRMAN WALLIS: Especially when you start to find things.

MR. GILLESPIE: We have occasions in several licensees where because they were sticking to a more extended inspection period, even when they had evidence of water, they did not consider evidence of water equivalent to accelerated corrosion visually.

So this ISG actually tries to take the principle you just espoused and says, "You can no longer in our expectation, staff's expectation, you can no longer ignore the presence of water. You have

to now give us positive confirmation that the rate of degradation is still being minimized.

CHAIRMAN WALLIS: It is not boric acid.

MR. GILLESPIE: Yes, yes. At least we're dealing with a general moisture.

CHAIRMAN WALLIS: Right.

MR. GILLESPIE: And so this actually does go for that extended period to some incidents in which we actually have evidence from various licensees. They had evidence of water and basically did an engineering evaluation and did not obtain positive information if the thickness was okay.

MEMBER BONACA: What are you going to do when one of the already approved license renewals is going to come in for another license renewal?

MR. GILLESPIE: They have talked to us about that.

MEMBER BONACA: Well.

MR. GILLESPIE: I'm hoping to be retired by that point.

MEMBER BONACA: Anyway, I think we will see how this works.

MR. GILLESPIE: I started with the draft of the renewal rule in 1989 and have been doing this now for the last five years. At some point, someone

else should do it.

MEMBER BONACA: All right.

MR. GILLESPIE: Thank you.

MEMBER BONACA: I give you back the meeting, Mr. Chairman.

CHAIRMAN WALLIS: We are ready to come off the record. Thank you very much for recording the meeting today, and we will take a break until a quarter to 5:00.

And when we come back, we will finish Mario's letter, which seems to be fairly straightforward. And then we will know where we are going with the other letter, hopefully know well enough that we can see our way to the end of it tomorrow.

(Whereupon, the foregoing matter was concluded at 4:34 p.m.)