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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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MEETING OF THE SUBCOMMITTEE ON RELIABILITY AND

PROBABALISTIC RISK ASSESSMENT

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FRIDAY,

FEBRUARY 22, 2002

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ROCKVILLE, MARYLAND

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, T2B3, 11545 Rockville Pike, at 8:30 a.m., George Apostolakis, Chairman, presiding.

COMMITTEE MEMBERS:

GEORGE APOSTOLAKIS, Chairman

THOMAS S. KRESS

F. PETER FORD

DANA A. POWERS

WILLIAM J. SHACK

STEPHEN L. ROSEN

ACRS STAFF PRESENT:

MICHAEL T. MARKLEY

ALSO PRESENT:

ADRIAN HEYMER

BIFF BRADLEY

TOM HOOK

DOUG TRUE

BILL BURCHILL

GARETH PARRY

MIKE CHEOK

TIM REED

PARVIS MOIENI

BOB LUTZ

LOUIS CHU

A-G-E-N-D-A

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

8:34 a.m.

CHAIRMAN APOSTOLAKIS: The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Reliability and Probabalistic Risk Assessment.

I am George Apostolakis, Chairman of the Subcommittee.

Subcommittee members in attendance are Peter Ford, Tom Kress, Dana Powers, Steve Rosen and William Shack.

The purpose of this meeting is to continue the Subcommittee's discussion of risk-informed revisions to the special treatment requirements of 10 CFR Part 50. The Subcommittee will review the proposed industry guidance in NEI 00-04, Revision B, "Option 2 Implementation guideline." The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Mr. Michael T. Markley is the Cognizant ACRS Staff Engineer for this meeting.

The rules for participation in today's meeting have been announced as part of the notice of

this meeting previously published in the *Federal Register* on January 30, 2002.

A transcript of this meeting is being kept and will be made available as stated in the *Federal Register* notice.

It is requested that speakers first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's meeting.

This Subcommittee last met on December 4, 2001, to discuss 10 CFR 50.69 and NEI 00-04 Revision B. In a memorandum dated January 24, 2002, the ACRS staff forwarded a list of individual ACRS member questions on NEI 00-04 Revision B to the staff and NEI for use in preparing for this meeting. We would like to spend most of our time today addressing those questions and, of course, any other issues that our visitors would like to raise.

On February 11, 2002, the staff also provided a list of questions on NEI 00-04. Both lists of questions are publicly available and will be furnished upon request.

We will now proceed with the meeting and

I call upon Mr. Adrian Heymer of NEI and his colleagues to begin.

MR. HEYMER: Thank you, George.

My name is Adrian Heymer, I'm the project manager with NEI responsible for risk-informed activities covering Option 2 and Option 3.

We've got here today at the table some utility people and Doug True, whose been helping us with the guideline, especially in the area of categorization.

On my left I've got Tom Hook from Dominion and Surrey is a pilot plant. They've just gone through the IDP. And he's here to give some insights into the categorization and the IDP process that went on at Surrey and what they learned from it; some of the strengths, some of the weaknesses.

And I think it's worthwhile saying that as we've gone through this process, this is the third pilot activity that was done a few weeks ago at Surrey. The first one we learned a lot; we tried to incorporate the lessons learned into the second. The second we learned a little bit more and refined the process. And so when we got to Surrey I think it was a reflection of just a general learning experience. And that's the whole idea of the pilot activity.

I think it's true, as with all things, that we drafted a guideline and the staff said they thought it was of sufficient level to allow the pilots to proceed. And we proceeded down that path recognizing that we would learn things as we went through the pilot activities to strengthen; have to go back and strengthen the guidance.

Doug True is here on my right from ERIN Engineering, and he's been helping us with specifically on PRA issues and categorization as a general advisor on the Option 2 activities to NEI and the industry.

On my far right is Bill Burchill from Exelon. And Bill has been with the Option 2 activity and risk-informed regulation since really the start. He represents Exelon, who was a pilot plant at the Quad Cities that was done last year as the first one and that really identified that we had a little bit more work to do. And Bill will assist us in responding to some of the specific questions.

Also in the audience we have Parvis Moieni from Southern California Edison, Jason Brown and Bob Lutz from the Westinghouse Owners Group. They're here representing Wolf Creek whose the fourth pilot. And also the Westinghouse Owners Group who have been very

active in this Option 2 activity.

And we have a few other members of the industry from NEI in the audience.

What we would like to do today is to go through just an overview of what we're going to cover fundamentally. We're going to just go back and do a very brief overview of NEI 00-04, go through that in about 30 minutes and then get to the interactions on those specific questions.

And then also as we go through the process, either at the end or as we're going through the process, we'll invite the pilots to provide some insights into some of the pilot activities and what they learned both from the PRA perspective, form the PRA quality and from the categorization.

So, that's what we want to try.

The first couple of slides are really principles, and it was just to give a sort of a general introduction as regards what the principles of risk-informed regulation, and it's really focusing on the right stuff.

And we've got smart as years have gone by, and so it's the application of NRC requirements based on the safety significance of the equipment and the activities. I have taken into account what we've

learned through operating experience, the design and engineering techniques and insights from PRA and also taken advantage of advances in technology.

And the real thrust of this is that the real focus of the regulatory requirements should be on those matters that are safety significant, not necessarily at low safety-significant. And that was really the purpose of Option 2 as we see it, and I think it's really important if we're going to be successful in this enterprise and this activity to look at what really is Option 2. And it's the application of NRC's special treatment requirements such as QA, EQ, 50.55(a), the maintenance rule, Appendix B, which is QA based on the safety significance of the equipment. And it's fundamentally a two step process.

The first step, which we're really focusing on here and which the guideline will focus on, is the categorization. The second step is the application of treatment.

There are some ground rules that have been established as we go through this, and one of those ground rules is right up front, which was the design basis are not changed. And I think when the industry started off on Option 2 we had a view that perhaps we

were going to change the definition of safety related and we would have two categories.

As we started interactions with the staff it became clear, especially since we were going to maintain the design basis and this was going to be an optional activity, that in fact perhaps we should have a slightly different structure. And the NRC staff proposed the full box, the quadrant structure. We took a look at that, we assessed it and we felt that we could probably work with it. And that's we've been trying to do. But the real thrust of this discussion here is on the NEI 00-04, the categorization process and that's what we're here to talk about today.

I'll now hand over to Doug True, whose going to give a very brief overview. And we probably won't go through all these slides as a matter of time, but we will just give you a very rough overview of what NEI 00-04 talks to as regards to categorization.

MR. TRUE: Do they have this?

MR. HEYMER: Yes. You should have the handout.

CHAIRMAN APOSTOLAKIS: We don't. We have yours.

MR. HEYMER: No. It's the same thing --

CHAIRMAN APOSTOLAKIS: It's the same

thing?

MR. HEYMER: No.

CHAIRMAN APOSTOLAKIS: No, it can't be the same thing.

MR. HEYMER: There were two sets in the package I just gave you. One was the --

CHAIRMAN APOSTOLAKIS: Oh, there were? You guys got it? Yes, we didn't get it. All right. Let's go on.

MR. HEYMER: Well, it's early in the morning. I sort of lost a few marbles last night or something.

CHAIRMAN APOSTOLAKIS: Okay. Doug?

MR. TRUE: Okay. As Adrian said, we have a lot of material here. I'll just kind of slip through these quickly and kind of hit on a few high points in order to get through this quickly and get on to the questions.

I'm going to skip through to I think it's the fifth slide, safety-significant attributes. I just want to make a couple of quick points on that subject.

One of the things that we started with, actually, in the Option 2 effort within the task force was to look at well if we think about what PRAs have

told us, we're going to find what are the differences and where are we going to find differences in what the design basis has told us about important equipment and what PRAs have told us. And we kind of keyed in on this notion of safety-significant attributes.

So for the equipment that were identified as safety-significant through whatever categorization process we used, we wanted to keep track of that, what attributes of those components made them safety-significant.

And that comes from the fact that the performance requirements for the design basis in some cases are more limiting than for PRA or for risk assessment perspective, and in other cases the accident performance is more limiting than the design basis. So we have this kind of mix and match we have to reconcile.

And as part of the categorization process we expect the categorization team and the IDP to address those attributes which make the SSCs safety-significant. And those things include the functions, the performance attributes, the pressure flows, temperatures, environment; that kind of thing, and any actuation requirements.

And just as kind of a point of reference,

we provided two hypothetical examples which are not a particular reach in this area.

First in the area of RISC-1s, those are the safety related, safety significant SSCs. For BWRs the ability to vent a containment and remove decay heat is often a safety-significant function. And so we realized that containment vent valves, which are part of the containment isolation system, might end up being safety-significant. And while their design basis function was to close to isolate the containment, there severe accident function or core damage in the containment failure function was to open and control -- open and close in order to control containment pressure and allow decay heat removal. So we were expecting the valves to do the opposite thing that the design basis expected them to do.

And here's some examples of the safety-significant attributes that might be tracked in this process include: What are the conditions we're expecting the valve to have to open under; what kind of capability does the PRA assume we need for being able to open that, whether it's from the control room or be able to do that locally using air bubbles or whatever. Different PRAs and different plants have different capabilities in those areas.

But as we moved forward and we implement Option 2 and we made changes to the plant, we would want to keep track of those attributes and put that into our change control process so that we didn't lose track of the fact that those were now important functions for those components.

In the RISC-2 area, which is a non-safety related but safety-significant SSCs, an example might be a startup feedwater pump that was originally designed to help the plant go through power ascension and shutdown has no particular design basis from an accident analysis perspective, but in some plants it probably provides a risk significant function of making up to the steam generators as a backup to aux feedwater effectively in cases where all aux feedwater might be lost.

In that case, we certainly would want to keep track of the flow and head requirements, which probably are not a lot different than design basis. But in some plants also the ability to attach that startup feedwater pump to 1E Bus and power from a diesel generator so that it works in the event of a loss of offsite power is an attribute that we would want to keep track of and not lose over time as the plant changed.

CHAIRMAN APOSTOLAKIS: What you are categorizing is a component, right? I mean, if I look at the matrix, I will see components in there not attributes or anything?

MR. TRUE: No. You categorize the component.

CHAIRMAN APOSTOLAKIS: Yes. So this discussion helps us do that, is that what you're saying?

MR. TRUE: I think all we're saying is that there's an adder -- when we go to the process of -- through the process of categorizing we say this startup feedwater pump is safety-significant, we want to not only know that it's safety-significant, we want to know why it's safety-significant so that we incorporate those attributes into the change control processes going forward in the plant and we don't lose track of that.

CHAIRMAN APOSTOLAKIS: Yes. Well, and that presumably --

MR. TRUE: And that the treatment is focused on those aspects.

CHAIRMAN APOSTOLAKIS: Presumably when you declare the safety-significant, you went through this process, right? You knew already. I mean, that's why

you said it was safety-significant because of all these things? And then you pass that along to whoever makes a decision?

MR. TRUE: Right. Right. But, for example, the startup feedwater pump, it is not safety-significant in being able to function post-seismic event. See, we can't paint all the components with the same brush because it's not like the safety related designation which automatically gets category 1 seismic and 1E power and all those things.

In this case we're going to have a little bit more mixture of attributes that are important and we're going to have to keep track of those.

CHAIRMAN APOSTOLAKIS: So that would be more relevant when you decide what treatment to apply?

MR. TRUE: Yes. Yes.

CHAIRMAN APOSTOLAKIS: Which is very different from the current practice of safety related gets all --

MR. TRUE: Gets everything and everything else is treated in a different way.

CHAIRMAN APOSTOLAKIS: I believe South Texas had a separate category for that in the middle somewhere there where it was focused. But anyway, let's go on.

MR. TRUE: The four step process, I'm going to kind of skip through that. And just talk about a little bit the structure of the categorization process. Slide 8.

As you know from reading the document, we've tried to utilize the PRAs where they're available and use importance measures as a screening tool to identify the potentially safety-significant structure systems and components. We then utilized some sensitivity studies to test the robustness of those base importance measures.

One of the things we were looking for in the categorization process was one that was relatively robust and stable and we're not going to have SSCs jumping in and out of the categories over time. And so we've tried to use the sensitivity studies as one of the ways to make sure we are assuring that that's the case.

Where PRAs aren't available, we've tried to be more conservative in the way we've applied the categorization process knowing that if utilities wanted to go off and develop a PRA in an area where they don't have one and gain some additional benefit, they could do that. But if they had a seismic margins analysis, for example, instead of a seismic PRA we

wanted them to be able to use that as part of their categorization scheme.

We take all that risk information and supplement it with some defense-in-depth assessment. And then finally at the end we do a sensitivity study to look at the aggregate impact of a postulated change in all of the RISC SSCs simultaneously jumping to some higher unreliability to make sure that that change was small.

And, as I said, the objective was to develop a scheme that was comprehensive, didn't just focus for example on internal events and kind of hand away through the other hazards and operating modes, and robust to the importance measures, took into account the fact that there could be variations in them. And then long term stable so that we weren't having equipment jumping from one category to another over the life of the plant.

DR. ROSEN: Doug, you would acknowledge, would you not, that your next to last bullet while it is bounding, it's certainly unrealistic?

MR. TRUE: I think it is very unrealistic. That all of them would go to some upper level of value.

DR. ROSEN: All at one time -- suddenly?

MR. TRUE: All of them.

DR. ROSEN: And all at one time?

MR. TRUE: All at one time. Without you noticing it.

DR. ROSEN: And without anything to do -- I can't imagine anything that could do that to all the components.

MR. TRUE: In fact, we believe that likely there will be very little change in the performance --

DR. ROSEN: Well, that's totally unrealistic.

MR. TRUE: Yes.

DR. ROSEN: But the answer that comes out of that sensitivity study in the next to last bullet is really very unrealistic.

MR. TRUE: I believe so. But if we need it, or we use it because we realize that there are shortcomings in using individual importance measures. And if you're going to -- individual importance measures are going to make any decisions about individual components of getting insights about individual components, we're talking about a batch of components and the individual importance measures are not useful for that. So a sensitivity study is a way to address the fact that there could be synergisms

that we want to look for in that aggregate of assessment helps us --

DR. ROSEN: But nobody should use the number that comes out of that and believe it as being anything that's physically real?

MR. TRUE: Correct.

DR. KRESS: Wouldn't it be better to treat that like a common-cause failure or you only change the failure frequency of one of them, but use some multiple Greek letter to get the probability of failure of the others in order to get an importance measure? What do you think, George? Rather than just say the whole group has a --

CHAIRMAN APOSTOLAKIS: To have a lower -- yes.

DR. KRESS: Because they're not all going to fail at the same time.

CHAIRMAN APOSTOLAKIS: Sure.

MR. TRUE: Well, they're not all -- we're not saying when they all fail. We're saying their probability of failure all goes up by a factor.

DR. KRESS: When you do the RAW for the group, you assume that measure is all of them going.

MR. TRUE: Yes, the RAWs are done individually as a part of the screening process.

DR. KRESS: Oh, you're not doing --

MR. TRUE: No. No.

CHAIRMAN APOSTOLAKIS: They just do probability.

DR. ROSEN: Just going to a Delta CDF for the group, but through the sensitivity study.

MR. TRUE: Through the sensitivity study of increasing the unreliability --

DR. KRESS: That's by increasing the factor of 10. But the RAW is simply for one component--

MR. TRUE: For individual events.

DR. KRESS: Yes, that's what I think you ought use, common-cause and get a different RAW than that.

CHAIRMAN APOSTOLAKIS: Yes, we'll come into that discussion.

DR. KRESS: Okay.

DR. POWERS: Can you give me some more insight of what a defense-in-depth assessment looks like?

MR. TRUE: Yes, if you'll hold on just a couple of slides, we'll get to that.

CHAIRMAN APOSTOLAKIS: Now, when you say your PRAs are not available, what does that mean?

That they are not available because nobody has ever done a PRA for this particular mode or this particular licensee happens not to have a PRA for something for which others have done a PRA?

MR. TRUE: The latter. Where a plant does not have a PRA currently.

CHAIRMAN APOSTOLAKIS: So there should be a clear demonstration then that the categorization process is conservative in that case, and we'll come back to that during the discussion I hope?

MR. TRUE: We can. I actually didn't plan on all those flow charts that go through every different way we look at things. We can --

CHAIRMAN APOSTOLAKIS: I mean, there was a question on fires which you presumably have addressed?

MR. TRUE: Yes. Yes.

CHAIRMAN APOSTOLAKIS: There was a question. So when we come to that, we'll probably raise a similar question.

MR. TRUE: Okay.

DR. SHACK: Well, since you're not covering that, let me just -- you know, as I read the seismic margins analysis, for example, it looks to me like you're protecting your one shutdown path, at

least that's the way I read this. You know, I look at what I need for that one shutdown path and I categorize to maintain that shutdown path. But in fact, I couldn't in fact be upping my risk because I'm not really paying attention to the other things that are neglected in the margins analysis that could in fact give me an assessment. So my change in risk could be larger than I think it is?

I'm not sure how in the margins analysis you assure that your categorization process is conservative.

CHAIRMAN APOSTOLAKIS: Or the final analysis.

MR. TRUE: Well, it's the same sort of thing. Anytime you have the margins analysis --

CHAIRMAN APOSTOLAKIS: That's right.

MR. TRUE: -- and you're protecting one or a limited set of shutdown paths --

CHAIRMAN APOSTOLAKIS: A screening. Whenever you have a screening process to demonstrate that something is not important, it's not clear to us how you handle it and whether the results are conservative.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: So I don't know

whether you want to address it now or later.

MR. TRUE: We can come back.

CHAIRMAN APOSTOLAKIS: We'll come back to it. Okay. Great.

DR. FORD: Can I follow up on this question of the areas where there is not a PRA?

MR. TRUE: Yes.

DR. FORD: In reading through the 00-04 document I was looking for references to time dependent degradation of passive components. And I couldn't find anything at all in that document which related specifically to that. And degradation of the containment, for instance, or some of the passive components like core shrouds or whatever.

If there was a component which was safety related and was put into RISC-3, how would that be determined when you don't have a time dependent PRA for those phenomena? Could it be done by an IDP process? And if so, who would be the experts on the panel to address this?

MR. TRUE: I think the categorization process in 00-04 isn't really designed to deal with passive loads of components. There's a separate --

DR. FORD: Passive components are mentioned in 00-04.

MR. TRUE: Yes, I think we hand it off to the ASME.

MR. HEYMER: Yes. The prime thrust of the categorization that we cover is dealing with active. When we get to passive there are ASME processes out there that look at classification of passive components. And what we say is that it's assumed to be where it is today, unless you've done one of those passive categorization schemes that is run through ASME. And then if you've done that, then you can start looking at things like the pressure boundary. But that's what you've got to do.

So we hand off to, we point to another group that's already done that work. And so we're relying on those.

DR. FORD: So time dependent degradation of passive components; pressure boundaries, core shrouds which are not pressure boundaries, but things of this nature which are safety related are not covered in this document?

MR. HEYMER: If they're not covered by the ASME process, they're not covered by this document.

DR. FORD: Okay.

MR. HEYMER: Tom?

MR. HOOK: Yes. I just wanted to make a

point that in the current draft of ASME code case that categorizes passive components for the Option 2 effort it makes the assumption that those passive components are failed for the purpose of the categorization. That the failure rate is 1.0 and only focuses on the consequence of failure.

So, items like core shrouds and containments all come up as high because of that process.

DR. FORD: So they'd be automatically in RISC-1 and RISC-2?

MR. HOOK: Right.

DR. FORD: Okay.

MR. TRUE: Okay. We use a variety of quite specific RISC information and deterministic information. I don't need to spend any time on that.

PRA quality, I had several questions that dealt with that which we'll get back to, but I thought it deserved a brief discussion.

The 00-04 allows for the use of NEI 00-02, which is the peer review process or the ASME standard for evaluating the quality of the internal events at-power PRA. We believe out of both of those documents, the peer review provides the greatest insight into the strengths and limitations of the PRA. And that the

observations that come out of that peer review process, whether it's one driven by the ASME standard or from 00-02 have to be dispositioned as part of this process. And those are either dispositioned by incorporating -- making a change to the PRA model to address the observation, look for a way to handle that through sensitivity studies which are then passed on and looked at as part of the categorization process, or provide some justification that the assumption or the issue that's raised in the observation doesn't effect the categorization. I think that that third one is probably the least likely to be used, but there may be cases where depending upon the comment, that might be applicable.

Then it's up to the utility or the licensee to provide a characterization of the PRA quality. And that's submitted to the NRC staff at the time you enter into the Option 2 process and before categorization is done, along with an explanation of the scope and schedule of what's going to be done.

And that characterization, and as well as passed on to the integrated decision making panel so that they understand what they're dealing with in terms of the PRA quality.

And the things we want to look at are:

How well does the PRA address the as-built as operated plans; what did the peer review say about the internal events PRA; how were those observations that were classified as significant in 00-02 parlance, that's A or B --

CHAIRMAN APOSTOLAKIS: But this list doesn't say anything about uncertainty. And it talks a lot about sensitivity.

Now, as far as I know, the standard computer codes that the industry is using to do their PRAs have capability of propagating uncertainty, the standard behind, you know the failure rate uncertainty. And I'm surprised that you resort to sensitivity studies all the time. Why? What's wrong with or is it so expensive to do? I mean, it would seem to me that it's kind of routine these days to do that.

MR. TRUE: Yes. I don't think -- I guess there are two things about that. Certainly there are tools available for the major PRA codes to allow you to do uncertainty calculations on the parametric uncertainties at least.

CHAIRMAN APOSTOLAKIS: Yes.

MR. TRUE: The sensitivity analyses that we're talking of tend to be more focused on the

modeling and assumptions of the model.

CHAIRMAN APOSTOLAKIS: Well, that's not the impression I get when I read NEI 00-04, and we'll come to that. I mean, I would agree with you a 100 percent that that's what should be done. But if you read the document, that's not what it says. But this is one of our questions.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: So we'll come to that.

MR. TRUE: In particular related to the facts and observations in this slide where we mention sensitivity analyses, I believe it's relatively rare to have comments about the uncertainty distribution on individual perimeters that come out of the peer review and have those be an A or B significant in the overall result.

CHAIRMAN APOSTOLAKIS: Well, we'll see. We'll see.

MR. TRUE: So it's usually we're dealing with you didn't use this seal LOCA model or you made this assumption about room cooling or time for operator actions, or those kind of things.

CHAIRMAN APOSTOLAKIS: Well, for those I fully agree that the sensitivity analysis would be

very useful. But, again, I mean when I read the document that's not what it says. So we have to fix that.

MR. TRUE: Okay. Well then --

CHAIRMAN APOSTOLAKIS: Now, I have another question on this.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: It seems to me, I'm a little bit concerned that if one has a PRA, we're going to spend a lot of time talking about its quality. If one does not have a PRA, then we wave our arms, we do screening analysis and we come up with some results that may be questioned for 10 minutes, and that's it. Is it really over kill here just because you happen to have the study? Then we talk about the quality, have you used the ASME standard, have you used the industry certification process. And then we go to the fire and seismic and say, well, I'll do some screening calculations and here is my categorization. And believe me, it's conservative.

I mean, just because -- in other words, are we penalizing people for doing PRAs because now they have to defend them forever? It should be the other way around. Your life should be much more difficult when you don't have the PRA.

MR. TRUE: That's a wonderful question on excellence.

CHAIRMAN APOSTOLAKIS: Well, let's go on. It's just that I'm curious just because we have something, we scrutinize it to death and then in another area we say well we're going to do some conservative calculations and they will be good enough.

MR. TRUE: Yes.

DR. POWERS: If the calculations are demonstrably conservative --

CHAIRMAN APOSTOLAKIS: Are they in the other areas? I mean, I look --

DR. POWERS: They demonstrative to be conservative and the PRA is demonstrably realistic, then isn't that the appropriate split of labor?

CHAIRMAN APOSTOLAKIS: Yes. But you put to big "ifs" there. Yes, certainly.

MR. TRUE: Well, I think the second half, I mean the PRA is intended to be realistic. So that's the --

CHAIRMAN APOSTOLAKIS: I understand that.

MR. TRUE: I think it gets more attention, which is part --

CHAIRMAN APOSTOLAKIS: I think we should

make sure that the quality of the decision making process, you know, and its inputs is more or less uniform in the places where we have a PRA and in the places where we don't. And, again, I'm not convinced that that's the case. Okay, let's put it that way. I'm perfectly willing to be convinced, but I am not right now. And I think again as we discuss our questions later, these issues are going to come up.

MR. TRUE: Okay. One other thing about the PRA and the quality of the other analyses. It's still incumbent upon a licensee to demonstrate that they reflect the as-built/as-operated plant and that the things that carry over from the internal events PRA that may have been significant in that PRA, which is usually the basis for the other mode and hazard analyses, are properly addressed and identify any sensitivity studies necessary to address other areas of concern. And that's passed on to the IDP as part of their considerations.

CHAIRMAN APOSTOLAKIS: Why such an emphasis on the internal event PRA? I mean, you wouldn't want the fire PRA to reflect the as-built and as-operated?

MR. TRUE: Yes. No, that's what I was just saying. The last three bullets are the other PRAs.

And we have basically the same standard for those that we have to reflect the as-built/as-operated plant. That the peer review comments that have been received on the internal events PRA, which is usually used as the input for fire PRA, at least for doing the conditional core damage probability calculations, have been addressed and don't effect the fire PRA, for example. And then look for any PRAs where there's a need for sensitivities to address issues in those PRAs also.

CHAIRMAN APOSTOLAKIS: Now, in your --

MR. TRUE: I think we have the same standard on both. But because and practically speaking the internal events PRA tends to be the center and the focal point or the kernel of all the other PRA analyses come from, we tend to put more words around the internal event study.

CHAIRMAN APOSTOLAKIS: Even though we know that the experience over the last 25 years with PRAs has told us that fires and earthquakes usually dominate the risk, right?

MR. TRUE: It depends upon the plant, but that certainly wasn't South Texas' experience, but --

CHAIRMAN APOSTOLAKIS: Well, it certainly does --

MR. TRUE: -- other plants.

CHAIRMAN APOSTOLAKIS: -- but overall I think it's a true statement that they if not dominate, they are among the dominant contributors?

MR. TRUE: Yes, I would agree with that. Yes.

This was in case we wanted to talk about this.

Step 2, which is the actual categorization process and all of the figures that go along with that, we're looking at CDF and LERF. Importance measures are used as a screening tool. We look at both the initiator and the event mitigation. And we're looking for those attributes.

Back to the question about defense-in-depth, what we try to do there is step beyond the PRA itself and provide some additional information to the IDP on the defense-in-depth and the role that the SSC plays in providing defense-in-depth.

In particular for the RISC-3 SSCs, we have a process that we go through to looking at both core damage and early containment failure prevention and the role of SSC plays in defense-in-depth in that area.

CHAIRMAN APOSTOLAKIS: Again, I'm a little

confused here. It seems to me that if you have a robust PRA and you're using the importance measures from the PRA, the question of defense-in-depth should not arise because that's built into the PRA. That's why the Fussell-Vesely in RAW came out the way it did, because of the defense-in-depth.

Defense-in-depth should be an issue when you're now departing from the PRA, when you categorizing SSCs in areas where you don't have a good PRA or you don't have a PRA at all.

Why would I care? I mean, the fact that this pump is part of a one out of three system in the PRA is reflected on the importance measures. So on top of that I want to think about defense-in-depth again, unless I have left something out?

So I think these things should be made clear that, you know, when the panel is deliberating certain things are relevant to certain things and in other cases they're not relevant.

I mean diluting the input here it seems to me. That's why it all comes out the way it does, because there is some different -- like at South Texas they have higher redundance than the average plant. So if I calculate Fussell-Vesely in RAW, I will see that there. Now in other instances where I don't have a

PRA, then I want to alert the panel to the fact that they have to worry about defense-in-depth.

This is simple enough?

MR. TRUE: Well, your question is simple enough. I think the answer may be simple enough also, and we kind of skipped through this in the guiding principles. That we started with 1.174 in the principles of risk-informed regulation in where we wanted to go. And some of the things in 1.174 invokes in the defense-in-depth area are there's reasonable balance, diversity or redundancy not introducing common-cause failures.

CHAIRMAN APOSTOLAKIS: Yes, I know.

MR. TRUE: Those kind of things. And that's what we were trying to address through the core damage.

CHAIRMAN APOSTOLAKIS: Yes, but I mean we should be going beyond 1.174 wherever we feel that we know enough now. That's already a four year old document, right?

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: What I'm saying is not necessarily inconsistent with what's in 1.174. It's just a further refinement, I think.

My point is this question is much more

important in the cases where the panel does not have a PRA they can rely on, or maybe not at all, then when they have a PRA. For the internal events that's very good and has gone through the reviews and all that. Because then the importance measures reflect that a degree of defense-in-depth that's in the plant.

MR. TRUE: Yes.

CHAIRMAN APOSTOLAKIS: And I believe that should be part of the training of the panel. There should be a training session where they would understand what the whole situation is.

Steve, do you have anything?

DR. ROSEN: No. I think you have it exactly right, George.

DR. KRESS: Well, I think with one problem, and that is if I look at redundancy and diversity of mitigation systems and bypass, isolation and early hydrogen burn and things having to do with long term containment integrity, those will be in the PRA. I don't know what defense-in-depth things will not be in the PRA that you have to alert the panel to. And that's what my problem is.

CHAIRMAN APOSTOLAKIS: Well, but --

DR. KRESS: There probably aren't any.

CHAIRMAN APOSTOLAKIS: Well, if there is

a PRA, yes, I'm with you. But there are many other situations where they're categorizing things without a PRA or using a screening approach.

DR. KRESS: Like fire or seismic?

CHAIRMAN APOSTOLAKIS: Yes. Yes. Then they have to worry about this.

DR. ROSEN: Or things that aren't modeled in the PRA.

DR. KRESS: Yes. But those won't be these things. They --

DR. ROSEN: They will typically be in RISC-4 anyway.

CHAIRMAN APOSTOLAKIS: Right. Right. There is a reason why they're not in the PRA.

DR. ROSEN: That's right. Because the analysts couldn't envision a sequence in which that was imperative --

CHAIRMAN APOSTOLAKIS: Well, it seems to be that point --

DR. ROSEN: But you have a point with fire and seismic, though.

CHAIRMAN APOSTOLAKIS: Yes.

MR. HOOK: Because those can be important and they're not a PRA.

CHAIRMAN APOSTOLAKIS: I mean clear cut

guidance like that I think would help a lot, not only with the categorization, but moving things along, you know. So next time, for example, we visit 1.174 we'll have the benefit of all this.

By the way, NRC staff is you ever feel the need or urge to jump in, do not hesitate.

Mike?

MR. CHEOK: This is Mike Cheok.

A quick comment of this defense-in-depth. I think you're right that if it's in the PRA, that should be a consideration in your defense-in-depth considerations. But remember that the importance measures now only deal with CDF and LERF and we need to pull in things like long term containment heat removal using the defense-in-depth arguments.

CHAIRMAN APOSTOLAKIS: Well, if you are changing the objectives of the categorization, then of course, you're absolutely right. But that's exactly what I would like to see in black and white; do this in that case, do that in the other case. So what you're doing now is you're going beyond what the importance measures reflect. And then, of course, you're right; you have to worry about it. You are in the category of cases where you don't have a good PRA result, right?

DR. KRESS: Or alternatively there's no reason why you couldn't have an importance measure for those things.

CHAIRMAN APOSTOLAKIS: For those things, yes. Sure.

MR. CHEOK: That's correct. But, you know, right now we have the CDF and LERF matrix as to one step we are looking into.

CHAIRMAN APOSTOLAKIS: That's right.

MR. CHEOK: Unless we expand those matrix, we have to deal with defense-in-depth.

CHAIRMAN APOSTOLAKIS: Well, that's my whole point, that we can say: (1) for CDF and LERF if the PRA's of good quality, then there's no other issues of defense-in-depth. Those are all built into it. Then (2) now if you want to worry about the late containment failure and so on, then of course the Fussell-Vesely in RAW do not reflect those, as they are calculated today.

DR. KRESS: But they could.

CHAIRMAN APOSTOLAKIS: Adrian? Oh, sure.

MR. HEYMER: As regard the input into the discussion, we can have it now or we can take it later on when we get into the questions. But it might be worthwhile hearing from some of the pilots.

CHAIRMAN APOSTOLAKIS: Certainly. Any time. Yes.

MR. HEYMER: That have gone through this process, for them to just briefly describe how they addressed that in specific instances.

CHAIRMAN APOSTOLAKIS: Yes, we can pick up these things again when we talk about the question.

MR. HEYMER: Okay. Well, we'll wait until then.

MR. BURCHILL: This is Bill Burchill from Exelon.

You made a comment that I think I'd just like to make we understand your comment.

One of the fundamental principles in our approach as an industry to supporting this Option 2 initiative is that we would be consistent with the current framework of risk-informed applications that are specified by the regulation. And, you know, whether 1.174 is going to change in the future, it currently provides the direction to evaluate from a number of different perspectives.

And I think you're absolutely correct that where we have a PRA, we think it provides sufficient information, but on the other hand what we've also done is responded to those guidance from the current

regulatory environment that says advise the IDP on whether there's an impact.

So when we look at defense-in-depth it doesn't necessarily mean that we're doing something separate from the PRA that would necessarily be in conflict with it, but having done the PRA and having done the categorization, we say well does that have any impact on defense-in-depth and then we advise the IDP whether or not that's the case.

CHAIRMAN APOSTOLAKIS: Yes. I didn't mean to imply that you should deviate from 1.174. For heaven's sake, no. But you can certainly refine certain things.

And my other point is that the panel typically will not consist of experts who understand the PRA and its subtle and then understand the plant, and understand all sorts of things.

DR. ROSEN: George, excuse me. I think it will. At least in the South Texas case and I assume that the staff would insist on similar capability in other cases of other licensees, the panel has a risk and reliability expert on it. Not every member is a risk and reliability expert.

CHAIRMAN APOSTOLAKIS: That's true.

DR. ROSEN: But there is one, and his job

is to keep the panel informed of any implications like the ones we're talking about.

CHAIRMAN APOSTOLAKIS: My point is that the more explicit the guidance to the panel, the better off all of us will be. Okay? And making sure that you discuss the defense-in-depth assessment appropriately, but in certain instances is not as important in others. That means that would be a useful thing rather than saying defense-in-depth is important, you have to look at it in a blanket sort of way.

MR. BURCHILL: Bill Burchill again.

Yes, I think you're absolutely correct. And I think if you have a full compliment, let me put that way, of PRA information that's applicable, then the defense-in-depth becomes a supplementary piece of information, perhaps confirmatory or perhaps just advisory. But as you point out as well, where you do not have the PRA information and perhaps are you only using screening techniques, the defense-in-depth probably becomes a more important part of the mix of information.

MR. CHEOK: George, real quickly I just want to read 2 sentences from 1.174. It says here that it -- I just lost the place.

"It has been and continues to be an effective way to account for uncertainties. If comprehensive risk analysis is done, it can be used to help determine the appropriate extent of defense-in-depth to ensure protection of the public health and safety. When a comprehensive risk analysis is not done or cannot be done, traditional defense-in-depth considerations should be used or maintained to account for uncertainties."

That's what 1.174 says and I think it agrees with you just said and what Bill just said.

CHAIRMAN APOSTOLAKIS: We all agree.

DR. FORD: Could I just ask a question about the final bullet? By that do I understand physically what you're considering is long term degradation of concrete and the rebar?

MR. TRUE: No.

DR. FORD: No.

MR. TRUE: We're talking about the long term -- well, no unearly failures of the containment under severe accident conditions. Failure to remove decay heat, long term over pressure over temperature conditions.

DR. FORD: Okay. Because I know that in the plant license renewal area the integrity and

degradation of the concrete of the rebar is under consideration, but that's not what you mean in here?

MR. TRUE: No. No.

DR. FORD: Okay.

MR. PARRY: Can I just add a comment, just to clarify that.

This is Gareth Parry from the staff.

What's under consideration here, things like the systems that are used to remove decay heat, like the RHR system, containment sprays, fan coolers but not the structures themselves. I think that's right.

MR. TRUE: Correct. Correct.

DR. FORD: What about integrity of the containment, the physical integrity? I mean, at Oyster Creek I know that there we had problems -- I think it was Oyster Creek. We had problems of degradation, however in that case some of the steel. Does that come into this out of all in the categorization of RISC-3 components?

MR. TRUE: I don't see a path that someone could conclude that the containment is RISC-3. The containment pressure boundary is RISC-3. So I think we believe that the treatment of the containment will continue as is and we're talking about changing the

treatment.

DR. FORD: Okay. Not going to change that?

MR. TRUE: Same is true of the reactor coolant system --

CHAIRMAN APOSTOLAKIS: Are you saying that these categorization process as a generous statement does not apply to passive components? Is that what -- I mean, Dr. Ford has asked two or three questions so far and I'm not sure what the answer is. You refer to the ASME case.

MR. HEYMER: Where the ASME code cases reflect, which is really focused on piping and vessels and such.

CHAIRMAN APOSTOLAKIS: Right.

MR. HEYMER: If the licensee wishes to involve that code case and use that, then he can incorporate the results from that passive categorization into what he's gotten by the pressure boundary. Otherwise, the pressure boundary would stay as it is today.

We do not see things like containment structures being included in that, and as such they would stay exactly as they are today. And I think one of the principles we have is that the component or the

structure stays where it is today unless you can show that it's of low safety significance.

DR. ROSEN: But even in that case, Adrian, if the licensee wishes to use a code case, what you're doing is accepting or utilizing some flexibility to change the inspection intervals or testing intervals, but not to remove the components from scope?

MR. HEYMER: Well, in this case we would look beyond that. We would take it to the next step. So you --

DR. ROSEN: You've gone through the code case you're saying?

MR. HEYMER: Yes. So if it came down, it wouldn't just be increase in the interval necessarily of the inspection activity.

MR. CHEOK: I think the way the staff views this issue is that everything starts off as RISC-1 and it stays in RISC-1 unless you have justification to move it to RISC-3. So if you want to move a passive component from RISC-1 to RISC-3, you would have to use, for example, the ASME code cases to justify moving it to RISC-3.

DR. FORD: So if the staff came to you and said the containment vessel on the Seaborn Station and as an informed member of the public, I could say the

rebar is going to corrode. The staff asked you prove to me that the containment has still got its original design integrity; that would be kicked into the current in the IDP process?

MR. HEYMER: Well, no. That to me is a completely different issue associated with the current design and the integrity of the containment as it is today and is not a risk-informed activity. This process doesn't go out and say is the equipment adequate today. We assume it is. What we're doing is going through a categorization process to look at the insides and say if it's 1 today, can we justify making it of low safety significance? It doesn't take into account well is the design with the design assumptions or the corrosion rates, etcetera, are they still valid today. To us that's a different question.

DR. FORD: Okay.

CHAIRMAN APOSTOLAKIS: Shall we go on to the questions now or you have more?

MR. PARRY: I mean, we've discussed the defense-in-depth. You've insisted that the PRA has everything we need in it for looking at core damage issues. And I look at the slide and it seems to have some sort of a balancing between mitigation and prevention in it, kind of what you look for in those

context.

What you also stipulated was that perhaps a defense-in-depth assessment is more required for some issue like fire. And when I look at the slide it does not have anything in it that's familiar to the issues of defense-in-depth when I think of fire.

Now, is that just translation or is there some understanding here that these words deal with the prevention of fire; the detection and suppression of fires and the prevention of damage caused by fires here hidden in these words?

MR. TRUE: No, there's nothing hidden in the words. I think fire is a difficult one when you're searching for defense-in-depth, because as a practical matter we have designed our plants to have a protected train in most cases for fires. So if you have a fire, a large fire, you'll be left with one, exactly one train of mitigation which by definition isn't really defense only. It's a level of defense-in-depth, but you're not going to get more levels of defense-in-depth than one in most plants for most situations.

MR. PARRY: In most plants.

MR. TRUE: Unless you're South Texas and you have three 3 trains and they're all separated and

one of the last plants built in the country.

In most plants in the U.S. we have gone to a -- Appendix R has driven us to this single path. And because of the initiating event frequencies we see in fire PRAs, I don't see how a train that's used to mitigate a fire could ever have low safety significance because there's only one train.

And so I don't think we're going to find a lot of additional defense-in-depth in the fire area. It's just my experience from doing fire PRAs.

MR. BURCHILL: Bill Burchill from Exelon.

I guess I'd like to temper that just a little bit. If you talk about the Appendix R bounding fire, you know what we call an exposure fire, what you're saying is correct and the plant is designed specifically to provide a path for its protection. But in fact, the fires that will be more likely to occur in the plant at a higher frequency level are not bounding exposure fires or large control room fires, or something of that nature.

Most fires that have and probably will occur in a plant are of a much less extensive impact. And in those cases certainly the fires are protected through the use of the EOPs. You don't get your extreme safe shutdown procedure. You're working

through EOPs. And, in fact, you do look for defense-in-depth. You do look for any pathway that can control pressure, reestablish inventory if that's necessary. You know, obviously decay heat removal and so forth.

So, I think we have to be very careful not to let our thinking be dominated by the Appendix R design base approach. For that case what Doug is saying is certainly true. But for the more likely situation there are certainly are a number of ways that are available and, in fact, are actually invoked through the use of the EOPs.

CHAIRMAN APOSTOLAKIS: But I think the general -- I'm sorry.

MR. BURCHILL: And in fact, that's what a fire PRA represents. I mean, a fire PRA starts by going through what is the realistic response. We had this discussion, I think at an ANS meeting, Dr. Rosen.

In fact, the PRAs going to represent all those realistic paths.

CHAIRMAN APOSTOLAKIS: But I mean would the door, for example, that's supposed to be closed to prevent fires from spreading from one compartment to another, the smoke and so on, would that be part of the defense-in-depth philosophy? I mean, that you want these doors closed and so on because you are

preventing the fire from spreading; and that's not going to be in the PRA I don't think.

MR. TRUE: Right. Right.

CHAIRMAN APOSTOLAKIS: You know, if there is a PRA. So is that kind of thinking in part of the guidance to the panel or they will think about it naturally because they're experienced people? I don't know how that works.

Now, the fire protection engineers, you know, when you speak about defense-in-depth, they will tell you we have measures to prevent fires from occurring. Then given that the fire exists, then we want to mitigate its consequences and so on.

MR. TRUE: I think what we said in the fire section was that we felt fire suppression systems were something that would be normally reflected in fire risk analyses, and we could use this process. But that if you were going to go --

CHAIRMAN APOSTOLAKIS: But what we're screaming about this is you don't have that benefit, right? It's screening analysis that is --

MR. TRUE: Well, we should talk about fire, because --

CHAIRMAN APOSTOLAKIS: We will. We will.

MR. TRUE: And fire barriers like the door

you mentioned in general it's rare that a fire PRA explicitly addresses those.

CHAIRMAN APOSTOLAKIS: Does not?

MR. TRUE: And so we said in order to do a reclassification -- like as Mike said, the premise is you stay where you are unless you have a case. And so you'd have a case that said I've looked at this barrier and even if it doesn't work, it doesn't increase the risk and therefore it could be moved down. But we don't see that as being a natural fallout from importance measures, that would have to be a focused look at barriers.

So we think the process could apply to barriers, but we don't think a practical matter it's going to be applied.

CHAIRMAN APOSTOLAKIS: Anyway, let's move on because we are spending too much time. Shall we jump into the questions.

MR. TRUE: Okay. I want to just jump to one last --

CHAIRMAN APOSTOLAKIS: One last, okay.

MR. TRUE: One last thing on applications.

CHAIRMAN APOSTOLAKIS: Good.

MR. TRUE: Just so you understand where we are.

Three of the owners groups -- that was the last slide -- have pilot -- have undertaken pilot applications of the categorization process and guidance. And, in fact, in all cases developed additional guidance that they've used in that process.

And they've looked at both safety related and non-safety related, tried to get a balance of SSCs removing different boxes.

The NRC staff has been involved in observing the IDP deliberations on that. And we've had a case where we've had a spectrum of PRA information; fire approach is different, seismic approach is. And we believe, and we'll talk more about this when the pilots talk some more, we believe that through that that NEI 00-04 is a comprehensive and robust --

CHAIRMAN APOSTOLAKIS: Well, I wonder how you can draw that conclusion? What exactly does a pilot application tell us?

I mean, they take a document and they say okay it tells us to categorize certain things in a certain way. We do it and it works. We put them in category 3. I mean, where the pilot tell me that this was not appropriate or -- I mean, how can it question the document?

It could question the ease with which the document can be applied, but unless the panel that evolved it, the panel comes back and says gee, you know, everything you're telling us to do is nonsense, which I don't think is the case.

So, I wonder --

DR. ROSEN: That can't happen because the panel is the process in a lot of respect.

CHAIRMAN APOSTOLAKIS: Well, I don't know how I can conclude it's comprehensive and robust.

DR. ROSEN: Oh, I agree. I mean, I would be interested.

CHAIRMAN APOSTOLAKIS: I just don't know that.

MR. HEYMER: We started and we developed a draft guideline document. And some of the pilots provided input into that. And then we took that document and we took it into the field and we gave it to people and said now can you use this document.

And so the real process is to test out the document. And they started to use it and they identified some problems.

The IDP actually had some problems in the training process, and that's how we've gone through the lessons learned.

We're not saying that Rev. B as you see it today that was forwarded in June is the final document. We need to make some adjustments and in a number of areas. But the fact that the pilots took it and they could understand the document, and that they went through a categorization and identified weaknesses or areas where we needed to improve it, but they still went through it. And actually they came out at the end. And as we went through the pilot process, we've learned from the first and third look, and the second. And I think what we ended up with when you get to Surrey, admitting that we're going to have to refine it some, shows that we do have a reasonable and comprehensive process in place.

It's an evolution. It's to test a document; did they understand the document, could they use the document.

Bill, did you want to say anything?

MR. TRUE: No. Tom.

MR. HOOK: Having observed the Wolf Creek IDP and participated in the Surrey IDP, as Adrian indicated there were lessons learned in terms of some small word changes to the evaluation criteria in the NEI guide, specifically in section 5.2 in the IDP guidance on addressing defense-in-depth issues for

candidate RISC-3 components.

Where I believe the Surrey IDP felt much more comfortable with the new words and their appropriateness to address their concerns from the deterministic perspective from their areas of expertise with those words then the Wolf Creek did and probably the Quad Cities did. So I think there was an evolution in the specific words that brought the IDP to feel more comfortable with the categorization process. Not as much with the active, because I think the active didn't need as much revision, but the passive in terms of the draft ASME code case underwent significant revision between the Wolf Creek and the Surrey IDP having reflected the comments from the Wolf Creek IDP where basically it didn't work and they kind of gave up on the passive categorization at Wolf Creek. And Bob Lutz can speak to that more from the Westinghouse perspective.

In terms of your asking the question about well how does the IDP validate the process, I think the IDP validates the process when the members feel like the process works from their perspective, from their expertise and their view of is it acceptable to move this component for which I have some special knowledge of from RISC-1 to RISC-3 or RISC 2 to 4, and

such.

And at Surrey I think the members felt like they understood the deterministic basis as well as the PRA basis for components being in their categories much better than in the earlier IDPs.

MR. BURCHILL: Bill Burchill from Exelon.

I just wanted to add to that sort of segueying off of your comment about I think you said the IDPs won't revolt. In fact, and I don't want to state this in too exotic terms, the IDPs in fact will revoke if they do not feel the process is correct and addressing the right issues.

The IDP panel members are not a randomly selected group, of course. They're specifically chosen for both their expertise and their experience. And to be quite frank about it, they're very protective of what they believe is the integrity of that plant and particularly those coming from operations, they're very protective. And so they do not take at just face value what they're presented. They challenge it. In every one of the cases of our pilots it's been quite an experience. In one case it was near revolt and they said your process needs to consider the following things, your process must be bringing me the correct information.

So, I think that it's been a real learning experience for each of us that's been involved with it. We've, of course, previously had the similar experience with maintenance rule expert panels, but now we're talking about actually changing things in the plant, particularly leading to treatment changes. And we are very strongly challenged by these IDPs.

DR. ROSEN: That experience is not inconsistent with mine on the South Texas panel.

MR. TRUE: I'd expect that.

MR. CHEOK: George, I guess the staff has also been present at these three pilots. And one of the main staff comments was that there needed to be more structure in the NEI 00-04 process and in the IDP documentation as to what was deliberated. And I think I agree with Bill and everybody else who said that there's a lot of deliberations that goes on to be in these IDPs and that they actually go through extra lengths to try to determine that something is low safety-significant.

What the staff's comment was that I think we need to document this kind of process to ensure that it does always happen in the future and that also we need to document it in the present IDP deliberations so that we can know what they talked

about and what the basis for when you something in RISC-3.

So a lot of this process that's been talked about is not now in documentation that we can see, but we are pushing for more of this kind of documentation to be present.

CHAIRMAN APOSTOLAKIS: Okay. Shall we go to the questions?

MR. HEYMER: We provided a handout. We weren't going to put these up on the screen. We've got a handout. We were going to talk from these and so it would be an interactive process between the industry participants and the Subcommittee here and with the NRC joining in.

So rather than put just the question and that bullets up, the real purpose of the bullets is just a summary, but it would be more of a discussion session based on the questions as we go through them.

And I think some of them we've already got into in partial manner. And I think going through the exercise we've just done will help us.

Question 1: Why are there are four -- we read this as to be why there are four categories instead of three.

CHAIRMAN APOSTOLAKIS: That's what it

says.

MR. HEYMER: And, you know, when we started this off this morning the NRC staff, we came in with one proposal, the staff looked at it and said perhaps it would be more practical to come up with a quadrant approach and not have 50.49(b) as we did in Option B to Appendix J, but have a separate rule. So we took a look at the quadrants and we believed it could work.

Now, we've evolved a little from that, but I still think that a quadrant structure is correct. I will note that as we get into the treatment area we think that we're looking at three categories of treatment as regards Appendix B stroke safety related, augment quality and industrial balance of plant type activities. And that balance of plant activities is really a spectrum from items that you might work on as regards to water cooler way up into something that might be actually approaching the augment quality type of activities for something that has significant importance to the plant that may still be low safety-significant.

So I think what we're looking at here is not necessarily a hard line between RISC-3 and 4, but more of a perforated line between 3 and 4. But the

categorization is still there because we're not changing the design basis. We're still keeping the nomenclature of safety related, and that means something in the regulatory space. So I do think the quadrant structure is practical. It does move forward, but we are looking at -- I guess if we went through Option 3 and we're successful in everything in Option 3 that we're trying to go to, then perhaps we would just end up with 2 categories. But we see that the categorization is 4 with 3 degrees of treatment and with the third section of treatment being industrial balance of plant treatment being a very much a graded process depending upon where you are as regards to the importance.

But if the staff want to jump in there to mention the quadrant process.

MR. REED: I don't disagree with anything he said.

CHAIRMAN APOSTOLAKIS: Sorry?

MR. REED: I don't disagree with anything.

This is Tim Reed from the NRC staff. I agree with his characterization.

CHAIRMAN APOSTOLAKIS: So Option 3 might combine the two of them, but not Option 2?

MR. HEYMER: Right.

DR. ROSEN: That's just because of the way we structured Option 2.

MR. HEYMER: That's correct.

DR. ROSEN: It has nothing to do -- I mean, if you didn't have that, you would say that box 3 is -- we probably wouldn't have put the components that end up in box 3 in box 3, would not have made them safety related in the beginning if we had this process.

After we designed the plant or as we were designing the plant we did the PRA and IDP as part of an integrated design process for the plant that would have ultimately emptied box 3 into box 4.

MR. HEYMER: Right.

DR. ROSEN: And would have said okay, these things are not risk significant, therefore we're going to be treat them as nonsafety related.

MR. HEYMER: I think if you'll look at a new plant, I mean I think you would probably look to two categories, possibly three, but certainly I think you would look at two. Because the fewer number of programs you have the better it is from a long term perspective.

But, yes, I mean if we were starting off from scratch we probably wouldn't have the box 3

category.

DR. ROSEN: Well, the fact of the matter is we're starting off from scratch. Because there are some new plants being thought of by such companies as Exelon and Dominion. So I think that -- if it's revelation to anybody, that revelation might be important in what those entities are doing.

CHAIRMAN APOSTOLAKIS: Anything else on this question?

MR. BURCHILL: I was just going to comment.

From a utility perspective it's actually important to us to have the boxes 3 and 4 because there are continuing regulatory requirements before Option 3 may change them that apply to those RISC-3 components. And it's very important for the plant to maintain cognizance of that and assure that they're meeting those requirements.

So it really becomes a matter of bookkeeping even if treatment really is the same between the two categories.

DR. KRESS: That has to do with functionality requirements?

MR. BURCHILL: Yes, in some cases.

DR. KRESS: Yes. Personally, I don't see

any downside to having 4 boxes. So, you know, it just provides additional information as far as I'm concerned.

MR. BURCHILL: Yes. And again, it's almost a simple as mundane bookkeeping; the plant being able to keep track of those components that they have to maintain a continuing regulatory compliance.

DR. ROSEN: Those components which were born safety related?

MR. BURCHILL: Correct.

DR. ROSEN: Which we now understand probably shouldn't have been.

MR. BURCHILL: Absolutely.

DR. ROSEN: But we will continue to maintain their functionality.

MR. BURCHILL: Correct.

DR. SHACK: Well, I always assumed that the staff have some other -- you know, when we say they're not safety-significant, they're not safety-significant in terms of CDF and LERF. And it comes back to these questions that Tom and Mario keep bringing up about sort of frequency consequences and some of the other things. And I look at this attempt to maintain functionality in RISC-3 as trying to keep a handle on those kinds of concerns without bringing

in a new metric.

And so I always assumed that the RISC-3 and the emphasis on the functionality there was really part of a defense-in-depth frequency consequence kind of consideration that wasn't explicitly brought in. And if you said that CDF and LERF were your only considerations, then I think you would end up with a two bin system. But if you brought in explicitly other kinds of measures, you would end up with in fact something like the 4 quadrant box.

And that sort of one my questions that came in here, as I looked through this, is suppose you made the scope the same as the maintenance rule and you brought in Part 100 considerations; the component is used to meet those requirements and make that an explicit part of the consideration. Would you simplify some of these arguments over whether the component has to be functional or not? And, you know, you just automatically boost it up. Would it change the scope all that dramatically?

MR. HEYMER: Tom?

MR. HOOK: For the passive component categorization and the current draft ASME code case, Part 100 is a consideration, just to address that specific issue for pressure boundary components.

MR. HEYMER: Okay. Moving on. Question 2. Bill Burchill will start the response from the industry perspective on this. Bill?

MR. BURCHILL: Yes. Actually I'm going to respond to the next four questions which were generally categorized in your letter as the use of CDF and LERF as the sole criteria.

The first question asks whether there's a logical inconsistency between the safety criteria used in current licensing activity, specifically the concept of frequency versus consequence and the criteria used in Option 2.

And we took this quite literally in trying to respond to it. We think that Option 2 is consistent with other risk-informed applications which we've previously talked about and in that sense addresses more than just CDF and LERF. It does address defense-in-depth considerations, preservation of safety margin considerations and so forth.

But more to the question of the consistency, I think sort of what I would say on philosophic plane if you look at our current licensing structure beginning with, I guess, Reg. Guide 1.70 Rev. 2 back in the mid-'70s, we articulated that there was a clear distinction between those high frequency

events, relatively high frequency, anticipated operational occurrence events and the limits that we would place on them, you know, which are things like DNBR and critical power ratio. And then the next step down the curve would be those moderate frequency events where we would then impose -- actually it turns out it's similar limits to the AOOs. And then the very low frequency events, normally referred to as design basis events where we go to things like Appendix K and more severe limits.

And our thinking is that in fact what we're doing here is actually continuing the logical extension of that curve that core damage and large early release, neither one of which are associated with any of those first three categories because they disallow that as an end consequence, but now you consider an end consequence that's more severe than the most severe design basis accident consequence but generally of a much lower frequency. You know, some orders of magnitude in cases, but some coming close.

So if you think of the curve of the frequency versus consequence as generally sort of the Farmer line that was articulated almost 30 years ago, that this is just a logical extension of that whole concept. And as such, in fact, adds an enhancement to

our inquiry about the safety of the plant. You know, it says I've got these three that are under design base, they have a graduated set of criteria consistent with the challenge frequency and we're now looking at yet another point on that curve. And we're saying for these events which have a much more extreme end point, you know, generally we would expect to see them in a much lower frequency.

CHAIRMAN APOSTOLAKIS: I'm not sure I follow this argument. Couldn't there be a system or a component that would prevent the minor release but when it comes to serious severe releases, the system is really irrelevant? Would that system come out as being risk significant is CDF is my criterion? I think the thrust of the question is that there may be some SSCs that are really preventing minor releases, Farmer called them "of nuisance value," and these may not be captured. They may not be declared the significant if you look at the severe stuff. That's really the thrust of this.

I mean, there's no question that by going to CDF and LERF you're going beyond design basis and everything you told us is valid. But are we missing some stuff that, you know, may be preventing minor releases that may create an uproar or whatever by

focusing on the severe accidents beyond design basis?

MR. BURCHILL: I understand. I think there's two parts to the answer. One is that under Option 2 specifically we are maintaining the functionality of those pieces of equipment.

Well, let me start with things that simply stay in RISC-1. Things that stay in RISC-1 we're not changing anything. So what we're really only talking about is the subset that would be reclassified because of safety-significant into RISC-3. And in those cases we're compelled to maintain the functionality for all of their design basis responses, which would be for these less severe events.

Now, we're going to have a later question that deliberates, of course, whether or not there's an actual impact on that functionality or its reliability with respect to treatment. The evidence generally to date is, I guess, at best inconclusive on that, but it doesn't indicate a strong change in the negative direction. And, in fact, you know probably at best neutral.

So what we believe is that being compelled to maintain that functionality that we're supporting the response to those less severe events and that we're in fact not degrading that.

DR. KRESS: That presumes that the original classification of those as safety-significant captured their significance with respect to these smaller releases.

CHAIRMAN APOSTOLAKIS: Is it possible that some of them were not RISC-1?

MR. BURCHILL: Well --

DR. KRESS: And it's possible that they didn't capture all of those because the process by which they were -- the criteria used to put them in that category might not have captured all of them.

CHAIRMAN APOSTOLAKIS: I mean the old --

DR. KRESS: We got a new way to do it now, but --

CHAIRMAN APOSTOLAKIS: I understand. But were they safety related in the old scheme?

DR. KRESS: Oh, yes. That's the reason they're in that category.

CHAIRMAN APOSTOLAKIS: They were safety related. Yes. All right.

MR. BURCHILL: Yes. Right. I mean if they're safety related --

DR. KRESS: They were safety related. Now that presumes the old process for determining they were safety related caught all these frequency

consequence event components; that might be at the low frequency nuisance level. I'm not sure they did. The proof of the pudding in that is if you had a PRA that looked at all those things and actually calculated a frequency consequence and did a RAW with respect to components on these lower frequency consequence events. Had a RAW on the F-V.

And to me that would be a proof of the pudding, and I'm not sure it's captured this way because it has a presumption in it that they were captured originally.

DR. ROSEN: Let me ask a question designed to get very tangible about this. For example, what did the PRA independent panel at Surrey do with things in the waste gas processing system?

MR. HOOK: They worked in the scope of the pilot where the Surrey IDP --

MR. BURCHILL: Well, they were at Quad, the standby gas treatment system was one of the systems chosen. And, in fact, through the measures that were presented to the panel from the process of their significance determination, it was recommended that the system be reclassified into RISC-3. And the IDP did not accept that. The IDP in fact -- you know, I said about revolt. They rejected that information

and said we will not reclassify this.

DR. ROSEN: Here the IDP is standing for defense-in-depth.

MR. BURCHILL: Yes.

DR. ROSEN: And just using their intuition in saying --

MR. BURCHILL: Right.

DR. ROSEN: -- there isn't that much to be gained from doing this and potentially something to be lost, and we'd just rather not do it, so don't.

MR. BURCHILL: Precisely.

DR. ROSEN: And that's a familiar pattern from experience with IDPs. Just because the process allows it doesn't mean that the expert panel has to go along. And so I'm glad to hear that response.

DR. KRESS: Let me rephrase my concern. We have a category here called nonsafety related but safety-significant. You have a category because you did a PRA that said hey, we someone got this component overlooked in the old process and that we really should have been safety in there.

Now, what I was saying is if -- but that was with respect to CDF or LERF. Now, if you extended that concept to some low level frequency concept, I was saying is it's possible we missed those, we might

have missed some other things. And the only way we find it out is do the PRA. That was the nature of my comment.

CHAIRMAN APOSTOLAKIS: So you're really changing the argument. Billy was saying --

DR. KRESS: Just turn it around.

CHAIRMAN APOSTOLAKIS: -- that to go from 1 to 3 you have a functionality requirements and so on.

DR. KRESS: Yes, exactly.

CHAIRMAN APOSTOLAKIS: But Tom is really saying how about from 4 to 2.

MR. BURCHILL: That's an interesting point. In fact, I want to address both the 1 to 3 and the 4 to 2.

CHAIRMAN APOSTOLAKIS: Okay.

MR. BURCHILL: Because you could have, for example, a component. In fact, the example Doug put on his slide about the containment valves. You could have -- you know, the vent valves. That's normally under design base intended to close. Okay. And what we've got is a situation that for the PRA we want it to open. We want it to vent.

So whether or not that would be a candidate for reclassification from 1 to 3, I'm not

sure. But we certainly would now identify a new functionality, you know, because of this inquiry that would have a set of attributes associated with it which in fact may change the treatment of that component; if nothing else to cause us to monitor its condition and capability for this new attribute.

So I think -- I guess I don't see something that degrades anything that's presently in place. I think actually what we're presented is an opportunity to identify new functionalities and attributes that we really want to spend some time on, you know, that we want to pay some attention to.

DR. KRESS: Yes. I don't think it degrades anything presently in place either. I think there's a potential for missing things that the current process missed in the first place.

MR. BURCHILL: Well, actually now I understand completely what you're saying.

DR. KRESS: Yes.

MR. BURCHILL: Yes. And we're going to have to think about that. I don't think any of us would stand here today and say we will guarantee this process, we'll pick up those things that we might have forgotten before. I don't think there's any -- we would not -- yes, understand.

DR. KRESS: Yes. And that is the basis of my comment.

DR. ROSEN: But there is guidance at NEI 00-04 that says if something like that shows up --

MR. BURCHILL: Yes.

DR. ROSEN: -- that becomes an opportunity for the plant to exercise its 50.59 process.

MR. BURCHILL: Yes.

DR. ROSEN: And to make it safety related to the extent possible and to recognize an error. I mean, that's what the corrective action systems do everyday.

DR. KRESS: Yes, but my point was that I don't see in the process how you find those thing.

DR. ROSEN: Well, he's right. It's not the process that does it, although there's a lot of -- the process puts a lot of light and scrutiny on components. And in that process you're naturally going to find a cockroach if there is one.

DR. KRESS: It may very well, and I'm not sure of that. It's not explicit.

DR. ROSEN: You're right.

CHAIRMAN APOSTOLAKIS: Okay.

MR. BURCHILL: Okay. The third question had to do with somewhat of a variation I think of this

concept of the frequency versus consequence. And it addresses explicitly the provision of layers of protection which are part of the defense-in-depth. And that these pieces are generally classified as important to safety.

The implication of the question is that we're going to change something that's going to either change that level of defense-in-depth or eliminate it. And our answer to that is that compliance with Part 100, you know, as the example in the question is is not impacted by Option 2. In other words, we're still compelled of course to comply with that regulation.

Neither are there layers of protection explicitly impacted by Option 2. We don't anticipate in fact that equipment is going to be removed from the plant. The only thing that we understand would be changed would be the treatment requirements, but we must maintain functionality.

So there's not an expectation that we're actually changing these levels.

DR. KRESS: There could be a potential for changing the balance between CDF and LERF? You might change CDF some and not LERF or vice versa? And wouldn't that be a change to the defense-in-depth?

MR. TRUE: It's possible that CDF

theoretically could change more than LERF, but we are controlling that amount of change to be a very small change.

MR. BURCHILL: In both cases.

MR. TRUE: In both cases. So, yes, as a matter of --

DR. KRESS: You're saying you're keeping the balance within an appropriate range by keeping it small?

MR. TRUE: In some appropriate range.

MR. BURCHILL: The reason I was a little stumped on your question is I really wasn't thinking of CDF and LERF as separate perimeters being an illustration of defense-in-depth.

CHAIRMAN APOSTOLAKIS: But they are.

MR. BURCHILL: Yes, it's interesting.

CHAIRMAN APOSTOLAKIS: At the high level.

MR. BURCHILL: Yes. Yes.

DR. SHACK: So the argument in maintaining functionality is not the same; although you have the functionality if it works, the reliability could potentially be degraded?

MR. BURCHILL: Yes.

DR. KRESS: That's why a RAW tells you.

CHAIRMAN APOSTOLAKIS: Well, that's what

the whole issue is here, right?

MR. BURCHILL: Okay.

DR. SHACK: To come back and say that you're maintaining functionality just doesn't really address the question in a sense either. We're changing the requirements. Now whether they have a significant impact is a different -- that's a different question.

MR. BURCHILL: But that in fact --

DR. SHACK: Which, of course, is the relevant question.

CHAIRMAN APOSTOLAKIS: Was not even a question.

MR. BURCHILL: Yes, it was a comment.

CHAIRMAN APOSTOLAKIS: Just an argument supporting the other question.

DR. KRESS: Yes, you're right.

CHAIRMAN APOSTOLAKIS: Which were number 2 and number 5, I believe. 2 and 5 have question marks at the end. Three and 4 really are preludes to the questions.

Anyway --

MR. BURCHILL: Let me just use the opportunity with question 4, however, even though it's not posed as question --

CHAIRMAN APOSTOLAKIS: Yes. Yes.

MR. BURCHILL: -- to clarify that we are not addressing within this Option 2 arena the spent fuel pool and the fuel handling systems. It says rad waste systems. In fact, we are doing some of that, but it's principally the spent fuel pool and fuel handling are not explicitly under the scope of this.

We've talked about this functionality item and defense-in-depth, so unless there's a question on 4, we'll go on to 5.

MR. PARRY: Well, yes. You conclude the response to 4 by saying there's no conclusive evidence that a "'category-one quality requirements' actually provide improved SSC performance." I mean, I think that's true. I guess I would ask is there conclusive evidence that they don't provide improved SSC performance?

MR. BURCHILL: Well, I mentioned previously that I think our position is clearly there is not conclusive evidence. However, probably the most extensive body of evidence that we're aware that's actually attempted to provide this comparison was submitted on the South Texas docket in their exemption request. And I'm failing right now to remember the exact number of components, but it was in

the 20,000 range, I think. I may have that figure incorrect. But it was a large number that were looked at with comparison between those that had been maintained under a safety related regime and those that had been maintained under a commercial practices regime. And that document pretty clearly shows there's no statistical bias one way or the other.

Now, there's been argument about whether the conditions that were imposed were sufficient to test the case and so forth. But at least the evidence we're aware does not indicate a degradation in a systemic bias way.

Okay. Number 5 is a difficult one. It says: How does the ensure of SSCs that are deemed risk significant not essential for addressing acts of terrorism and sabotage? How does that get addressed?

We're looking at the potential for radiological release under the LERF consideration. But we do not under this program explicitly address acts of comission or sabotage or terrorism. We consider those are specifically addressed in a structured way under the security programs and we don't see that anything that we are doing here would actually change that. There's no linkage across to how the security program addresses preparation for

that type of an impact on the plant.

The programs, as I say, are not within the scope of Option 2. The one place which you may be aware that the PRA does get applied, we do assist occasionally in the security program in identifying what are called target sets of equipment. You know, those that would present the plant with disabling effect and therefore might be the focus of a sabotage or terrorism activity. But there's nothing about what we're doing under Option 2 that would change that activity or dilute the information that's being presented in support of the security program.

To be frank with you, I think what we could come up with as an answer on this one, because it's not considered under this, Tom, did you have a --

MR. HOOK: Yes. I just wanted to make one point. That in the target sets for plants there are nonsafety related components in the target set. So it's not a presumption that something's credited for sabotage and terrorism is a safety related component. So that dispels the concern about moving something from RISC-1 to RISC-3 as having an impact in terms of the expectation of its quality requirements for mitigating terrorism and sabotage events.

MR. BURCHILL: Right.

CHAIRMAN APOSTOLAKIS: Well, maybe this is a good time to take a short break.

So we will recess until 10:15.

(Whereupon, at 10:10 a.m. a recess until 10:2 a.m.)

CHAIRMAN APOSTOLAKIS: So we are now on question 6. So whose going to respond to that?

MR. HEYMER: We discussed as we went through sort of an overview of NEI 00-04 the PRA quality and we had some discussion there. And we thought that it would be worthwhile as we're in this question and we've covered some of these issues, that we would ask the pilot plants to speak to how they've dealt with this issue as they've gone through Option 2. And so, Tom?

MR. BURCHILL: Yes. Actually I think it's a little bit broader.

This is Bill Burchill with Exelon.

A little broader than just pilot plants. I'm going to really try to speak to this from a broader utility perspective.

There's a lot of focus in the PRA quality area that's been placed on the peer review process and the certification of PRAs as the measure of quality or perhaps the ASME standard or other standards that

under development as the majors to be applied. And I want to step back from that a little bit and talk about really how do you get quality in a PRA. Those two tools are certainly measures that are applied when a PRA exists and somebody wants to come in and evaluate it or the utility itself wants to evaluate it. But there's a much bigger picture on what produces PRA quality, and I'm going to try to speak to that and then Tom Hook is going to provide some other specific examples.

I think in today's environment where we are using PRA extensively for risk-informed application and daily, in fact, hourly perhaps in A4 support under the maintenance rule, that the first thing that one has to have to ensure quality is a well structured PRA program.

And what I mean by that is PRA, we've joked about this over the past few years. PRA has come out of the closet. You know, it's now a -- you know, we don't even call it PRA in at least Exelon anymore. We call it risk management. And it's a function that is right along side design engineering, system engineering, the maintenance function, operations function. It's a recognized function and it's governed by processes and procedures just as

other functions in the operation of the plant.

So a well structured program, which I think one will find in all utilities today, is the first starting point.

That process has to have internal process controls. Certainly as recently as even four or five years ago if you went to a utility and looked at the degree to which the way one goes about doing the preparation of a PRA or its documentation, you might find a less satisfactory condition than you would like. Today I would tell you that when you go out to utilities they either already have in place or are rapidly developing very highly structured procedures and guidelines for everything they do, and particularly those areas that are already in continuing use like the maintenance rule A4, those are all highly structured; the interface between the PRA function or the risk management function and the operations group and the work planning and work control or work management group is very well defined.

I think the third hallmark is you have to have a highly component PRA team. You cannot do what we're doing today with PRAs with amateurs. The people that are on the PRA team on the risk management group, they have to demonstrate their capability. And I know

that in Exelon and I believe this is becoming the practice, these people are certified just like other engineering disciplines. We have, in fact, seven different certification guides that each one of our risk management engineers must demonstrate their competence. You know, it's like a qual. process. So I think that leads to PRA quality.

The fourth is what I will call the documentation area. The improvements that have been made, certainly post IDP and very strongly driven by the certification process have forced utilities to really seriously think about the degree and extent and quality and traceability and retrievability of the documentation that goes along with their PRA. And I'm not talking just about what's written in a paper, but you know what decisions were made in developing of entries, fault trees, you know, approaches to human reliability analysis, whatever. Those are documented, those are retrievable.

You mentioned earlier, Dr. Apostolakis, that several of the PRA codes can provide the uncertainty analysis. Well, likewise they can provide documentation. There's automated tools for ensuring that those thought processes that are used to develop a PRA are captured.

We all I believe have a process of requiring ourselves to do periodic PRA updates. We have varying cycles on that, but the ASME standard, as you know, also compels that a periodic determination of the adequacy of the PRA to meet the representation of the as-built/as-operated plant is required.

And we also do unscheduled updates. If we have any modification in our plants, every modification in fact is evaluated for risk impact from two perspectives. One is whether or not the modification itself changes the risk of the plant and if so, that we recognize what the impact is. But also whether as a result of that modification the PRA itself must be changed so that for its other applications, you know, for example again A4, that that PRA adequately represents the plant.

So, we will have unscheduled updates to represent some specific either design change or procedure change. We will also then periodically go back and check the whole PRA and literally go in and check everyone of the 11 elements.

Now, as far as the risk management engineer himself and how does he assure that the tool that he's using or that he's improving is adequate, one technique is something I'll just call

reasonableness checks. I mean, there's a wild wealth of information today about PRAs. I mean, we're not functioning with one or two studies. You know, every utility has, and we're talking specifically full power internal events but we could be talking the other risk sources where those exist at different utilities as far as their quantification tools.

There's a lot of peer checking that can take place by just the individual risk management engineer. There's a lot of documentation of how other plants of similar design, similar vintage, similar equipment, how they have been assessed with respect to their risk profile. And so the first point in a reasonableness check would be, obviously, to go out and see how does the result you've generated compare with what others have found.

We do a series of acceptance reviews that can range from a second risk management engineer sometimes who, depending upon the nature of the development, is totally independent from the development process or to even bring in an outside party and review our PRAs. This is even before we would go to a certification team.

I don't want to represent to you that we do that in each and every change, but depending upon

the magnitude of the change if we had a significant update to a PRA, it's more than likely we would bring in another party to look at our work and see whether or not that was adequate.

Another point is, and this is certainly true at all utilities today, we all have significant management oversight of the application of our risk management tools. Again, PRA has come out of the closet. We are no longer a little study group off to the side where, you know, it's a study, it's nice, we look at it and it produces pretty pictures with pie charts and we put it on the shelf and don't pay too much attention to it anymore. It is now used everyday. It influences work planning. It influences the operation of the plant and management pays attention to those things. Management wants to know that those things that are influencing that plant's operation are sufficient.

Now we'll come finally at the end of my list to the PRA peer review and certification process, and the use of standards.

I think what you can see that I'm trying to develop is that those things when they're applied will only be successful in showing that the PRA is adequate if all these other attributes have been met.

In Exelon we have ten sites, literally 17 PRAs for 17 operating unit, and we've had them all through certification. I can tell you it's a fairly grueling experience. And I can't imagine that those would have been successful in not only measuring the PRA, but in developing a favorable impression of their capabilities if we hadn't done all of these preceding activities that I've described.

What shall I say? I'm not trying to just be rah-rah about it. This is a very serious business. It's an integral part of the plant's operation today, and it's taken quite seriously and, therefore, it is now integrated into the main fabric of the overall engineering operation.

I can tell you personally that my MBO -- we don't call it that -- for the past 2 years, actually 4, but particularly for the past 2 has had a very strong point in it about bringing the risk management activity into the mainstream of the engineering department and the overall nuclear organizations activities.

I'm going to turn it over then to Tom Hook who can give some more specific examples.

MR. HOOK: I just wanted to talk about Surrey and North Anna and Dominion's PRA quality

attributes that we think makes the PRA suitable for use in an Option 2 type application.

Now, first of all, a plant that participates in license changes through Reg. Guide 1.174 already has to address the quality attributes in the Reg. Guide in terms of the design meeting the -- of the models being consistent with the plant design, the quality of the PRA staff, the peer review having been performed. So most plants having submitted Reg. Guide 1.174 license changes already meet the quality attributes of that reg. guide. And Dominion has a living PRA program to ensure that it can continue to support Reg. Guide 1.174 type submittals at anytime.

The second attribute that Bill touched on that I think is very important for ensuring quality for my experience having worked in expert panels for the maintenance rule of two different utilities, is that there is a questioning attitude during the categorization process that occurs for the maintenance role. And many of the modeling problems that occur or inconsistencies with the plant design are uncovered during the maintenance rule review process, and that was very helpful at North Anna and Surrey in upgrading the quality of the PRA model.

Surrey and North Anna also were involved

in the risk-informed ISI and performed full scope class 1, 2, 3 ISI expert panel process and looked at a large scope of components independently in another expert panel and obtained a significant amount of comments and feedback, and PRA quality improvements as a result of the exchange.

Then through the NEI certification process PRA review there were additional comments that come back from outside observers through --

CHAIRMAN APOSTOLAKIS: These comments, Tom, I mean, you're using a failure rate, for example, is that a distribution that you are using typically or a point value and is anyone questioning whether that value's reasonable? I mean, how does that work?

MR. HOOK: Those types of questions typically do not come up unless there's -- it's point estimates. in general. And only -- the expert panel focuses more on the dependencies in the model and the accident sequence analysis than on failure rates unless the failure rates look totally inconsistent with expectations.

CHAIRMAN APOSTOLAKIS: But, I mean, I don't even know how these expectations are formulated when you talk about 10 to the minus 3, 4, 5. I mean, it's not something that we have some intuition about

that the failure rate should be this. I mean, we are looking at all these studies for a number years and then we say, well, gee, I expect it to be in the 10 to the minus 4 region.

But I'm really curious about that. I mean, we keep talking about failure rates and point estimates and so on. And I don't know where they come from and whether anybody questions them, or you know, why not use a distribution and is there a population of distributions out there that are reasonabler. And it's not just the failure rates. I mean, human error rates. And then the dependencies between human actions and so on. There are so many places where a factor of 2 here, a factor of 1 or a half there, you know, pretty soon we're talking about serious factors. And I don't know that anyone really looks at these things in a critical way.

Now, for some reason I'm under the impression the independent panel will not do this, even though they have a PRA expert on them. And it bothers me. I don't understand. I mean, and then we propagate those point estimates, we don't know what we're getting out of it. I'm pretty sure these things work fairly well, most of the time. What I'm complaining about is that I haven't seen a systematic

analysis or study that shows that they do actually work.

I don't know doubt that what you're proposing most of the time will give reasonable results. But in terms of building and maintaining public confidence, it seems to me that somebody ought to look at this thing and say yes it doesn't matter; that if you use the standard point estimates that people use, you are going to get reasonable Fussell-Veselys and RAWs and, you know, that in combination with the expert panel questions will lead to reasonable results. But I haven't seen that, and I don't know.

I mean, somebody says, yes, I'm going to use 5 10 to the minus 3 and another guy says no, I'll use 10 to the minus 4. What's the basis for that and what do I get out if a complex system like a PRA? You know, we know from the theory that inputs that are points estimates, so you don't know what you get out. If they are mean values, that is you know.

And then we declare them as being mean values without any basis, in my view. Why should the number be a mean value just because we say so? And that bothers me.

Again, I don't think it's something that

will really turn everything you are doing upside down. No. I know it won't. What really drives these things is model uncertainty. But why don't we take care of the stuff we know how to take care of so we don't have this feeling that what we're doing is okay? I mean the reactor safety study 30 years ago did do that.

MR. BURCHILL: I was just going to clarify that I agree with you. I don't think that the IDP is going to delve into this. It's not their mission nor, frankly, would they have the time or expertise other than their particular member from the risk management group. Certification teams do.

Certification teams are renowned for being quite challenging on the data sources that you use; whether or not they are recognized in peer review data sources, are they up to date, do they account for -- and I'm talking about generic sources now -- and then I believe that it's fair to say that they also challenge if you do not have plant specific data considered, if you've not upstated your data source, why have you not. And they will challenge has there been any known trend. The first thing they'll challenge is you do you know the trend in behavior of your components with respect to their reliability. and then they'll challenge whether or not if there has

been anything that would indicate deviation from your prior, so to speak. Have you taken it into account?

CHAIRMAN APOSTOLAKIS: But, Bill, that my concern. Do people do this on a routine basis? I mean, when we pick up a PRA and somebody has used it in Option 2, they have done a categorization and they use point values, what assurance do we have that these point values are plant specific and that they are indeed mean values? Do we have an assurance there? I mean, are they under any obligation to show us how they did that?

I remember some of the IDP, you know, some were very good. They used the standard methods to update and so on, as you know. But others, I remember one said oh for events for which we felt we didn't have significant plant specific information, we used generic sources only. For other the others we just used the plant specific data. And you scratch your head and say, first of all, how did they decide that they didn't have significant plant specific information. And then why this arbitrariness? I mean, we know how to handle these things.

And I think if we did that in this document, then a lot of the concerns about the sensitivity analysis would go away. And, in fact,

what you told us earlier, Doug, is the way to do it. Do a sensitivity analysis on major model uncertainties, not playing with a point decimal lambda. Who cares?

You're spending money on the pilot studies. I mean, would it be really an extraordinary expense to add a short study of several months showing to us that these things are handled well or they're relevant, or it doesn't matter? I don't understand that.

MR. TRUE: To me it's somewhat of a semi-infinite problem.

CHAIRMAN APOSTOLAKIS: In it not infinite, no.

MR. TRUE: Because the situation that exists in most plant specific PRAs is that a large of portion of data is taken from generic sources and the mean value from that generic source is used as a point estimate in the calculation.

And then for dominate by some definition or important by some definition, important components plant specific data is collected and then used to update that generic information to reflect more plant specific evidence.

The peer review process will look at all

pieces of that and say is the generic source you started with a reasonable generic source --

CHAIRMAN APOSTOLAKIS: Well, if they did what you just described. I'm not sure they always do that. Do they really take the mean value of the generic distribution as a point value?

MR. TRUE: I think the peer review team would have a hard time if you didn't do that. I think you would get criticized for that in your peer review.

There may be --

CHAIRMAN APOSTOLAKIS: And the issue may not be so much the hardware, how about the human error rate?

MR. TRUE: Well, the human errors are, obviously, one of the most difficult portions of the PRA to even compute and assign a probability to, much less have confidence that we have a true mean value of that parameter. In most cases --

CHAIRMAN APOSTOLAKIS: Well, let me let you know where I'm coming from. The Fussell-Vesely in RAW are uncertain, aren't they? I mean, if the Lambda--

MR. TRUE: Yes.

CHAIRMAN APOSTOLAKIS: Is there a simple analysis someplace, some study that shows that the

categorization is not effected by these uncertainties the way we're doing it now or was it a figure in the old paper by Cheok and Parry and Sherry that showed the some evidence that indeed for a lot of the components it doesn't matter unless the uncertainty is very, very large. But wouldn't the more systematic study show? I mean, there is a paper in the conference in '96 in PSA where a couple guys from Maryland did a similar thing.

You know, document that it doesn't matter, that the uncertainty's not something I should worry about rather than saying use point estimates and do it, and then the expert panel really will take care of it.

I think it probably doesn't matter, actually. But I would like to see that it doesn't.

MR. TRUE: I think one of the problems --

CHAIRMAN APOSTOLAKIS: Just once.

MR. TRUE: I think such a study might have some value and give us some more confidence. But the importance measures are really screening tools to try and bring in the components and --

CHAIRMAN APOSTOLAKIS: Yes, but screening tools are supposed to be conservative. How do you know they are?

MR. TRUE: Well, how do we know that 2 and .005 are the right thresholds?

CHAIRMAN APOSTOLAKIS: Well, that was another question that would be raised. Yes, don't assume we know.

DR. ROSEN: You can't go much lower than those numbers. I mean in terms of setting thresholds. Those are almost where we are before we started this exercise. I've characterized them as extraordinarily timid. You know, how low can you go. You could go to a one.

CHAIRMAN APOSTOLAKIS: 1.8.

DR. ROSEN: Yes, you could go to 1.8, you could go to 1.0. But we're talking about individual components that have a RAW of 2, this is --

CHAIRMAN APOSTOLAKIS: I just don't understand this reluctance to actually demonstrate once and for all that what we're doing makes sense instead of having to take it as an article of faith. That's all I'm saying. I need one cross mark. We're not talking about a million dollar study here. It's some experience guys like you can do it very quickly.

MR. TRUE: I think that the --

CHAIRMAN APOSTOLAKIS: How about that?

MR. TRUE: I'd be happy to do a million

dollar study. No.

CHAIRMAN APOSTOLAKIS: And then we play with the sensitivities and, say, take all the failure rates, put them in the 95th percentile. Hey, come on, now. Come on. This is not a sensitivity study worth its name. A sensitivity study should look at model uncertainties and say, you now, we have some uncertainty there, we really don't know how to handle it. But, look, if we do this and this and that and play some sensitivity games, we get this warm feeling that, yes, we are not off.

MR. TRUE: We'll get to the sensitivity studies in another question. Yeah. In some year we will.

I think we may learn something from such a study, but as Steve said, these thresholds are relatively tight already to begin with. And they're going to be screening in a very large fraction of the components that are modeled in the PRA as safety-significant. It's not like we've set bounds very far out and we're worried about already missing things.

And then on top of that when we do the sensitivity studies we'll talk about in a little while, we're even bringing more components over those tight thresholds into the screening process. And I

think if anything, we are probably being conservative in bringing in all the different --

CHAIRMAN APOSTOLAKIS: But you say we're probably being conservative. I don't know that.

MR. TRUE: Well, I don't know how to prove that we are --

CHAIRMAN APOSTOLAKIS: Well, you could.

MR. TRUE: -- or that we are being realistic or conservative in this.

DR. KRESS: It has to be done on a plant specific basis.

MR. TRUE: Because it's really specifics of the plants and more so to the modeling assumptions and things that go into the model than the parameter estimates.

CHAIRMAN APOSTOLAKIS: That's why one does studies like that, to show that the process is conservative or at least reasonable results. The fact that it may be difficult to prove it 100 percent of the time doesn't mean that you shouldn't try.

MR. TRUE: I guess I don't know if I did a study like that what the acceptance criteria would be for the result. Is it that nothing changes? Is it that --

CHAIRMAN APOSTOLAKIS: I don't know, for

example, if I actually propagate the uncertainties to Fussell-Vesely how much probability will be above the .005 or not. I don't know that. I suspect most of the probability will be above for the components you are declaring as RISC-1. I don't know how much. You know, I haven't done it myself. I don't know. And RAW, the same thing. I mean these things are uncertain.

DR. KRESS: But the problem is a RAW of 2 means something for one plant in terms of its effect on CDF and something entirely different for another plant.

CHAIRMAN APOSTOLAKIS: That's another problem, yes.

DR. KRESS: And --

MR. TRUE: Relative importance measure are--

CHAIRMAN APOSTOLAKIS: Yes, they're relative.

MR. TRUE: They're around the base value. And so a plant with a low CDF and a RAW of 2 has a much smaller absolute impact on risk than a plat with a higher CDF would have.

DR. KRESS: Yes, and I find that to be a problem. You know, that's penalizing the good plants.

MR. TRUE: Well, I think that it reflects a desire to stay within the basic framework you have--

DR. KRESS: You know, it's just like 1.174 in a sense, but that's penalizing the good plants in my mind, and it's treating them unfairly. You know, I think -- I'm saying that the thresholds ought to be plant specific. They ought to have something to do with their effect on CDF. You ought to incorporate the uncertainties because you need to have some -- the uncertainties will be different for different plants and you need to have a consistency in the confidence level that you want to meet these thresholds.

And, you know, it's just not coherent to say we'll use 2, and that's it for an example.

CHAIRMAN APOSTOLAKIS: For example --

DR. ROSEN: You're requesting a revision to 1.174.

DR. KRESS: Well, I've been suggesting that for a long time.

CHAIRMAN APOSTOLAKIS: Well, let me -- if you do a study like the one I mentioned, one of the things that you may want to investigate is defining a new RAW, RAW STAR, which is the ratio of the numerator as we do it now, you know, increasing -- actually it's a denominator -- increasing the unavailability to 1

and calculating the new CDF, but the reference value now will be perhaps 10 to the minus 4. The goal, now the base CDF. And see what happens. Then you are moving more to a more absolute measure.

DR. KRESS: Yes, that would incorporate my problem then. Yes.

CHAIRMAN APOSTOLAKIS: See, studies -- when I say studies, I don't mean just propagate uncertainty. I mean if you start investigating the whole analytical basis of the methodology, and then you could come up with questions like that. Would that be reasonable? I'm not saying it will be, but here is a possibility that would answer this question.

DR. KRESS: That would answer my question.

CHAIRMAN APOSTOLAKIS: Why use relative values for all the plants when, in fact, again we have a paper from distinguished members of the staff here that say that you should not be using these things, as I recall.

MR. PARRY: Can I chip in here, since we've been referred to? This is Gareth Parry again.

CHAIRMAN APOSTOLAKIS: Oh, you heard distinguished member and you felt --

MR. PARRY: No, I heard mention of a paper.

Remember that these -- and what's Doug or Bill said -- that these criteria for RAW for Fussell-Vesely are in fact only screens.

DR. KRESS: Yes.

MR. PARRY: The ultimate test, and you'll see it in NEI 00-04, is the absolute value of delta CDF and delta LERF.

Now, yes, you could change the RAW and Fussell-Vesely thresholds on a plant specific basis, and actually if you read Appendix A of Reg. Guide 1.174 you'll see we suggest it. But in a way, does it matter that much if in the end you're going to do this final test on delta CDF and delta LERF? It's a step to the final categorization --

DR. KRESS: That just confirms that the choices you made didn't do it.

MR. PARRY: Yes.

DR. KRESS: But you might have been able to put a lot more things in different categories.

MR. PARRY: Oh, you might have been able to put a lot more, yes.

CHAIRMAN APOSTOLAKIS: But the thing that bothers me, Gareth, is that we are saying or we're asking ourselves does it matter that much too many times. Where do you draw the line? When does it

begin to matter?

It doesn't matter that we don't have a structure IDP process whereas SDP did. It doesn't matter that perhaps the factor by which we increase the failure rates is 2 to 5 rather than 10, as SDP did. It doesn't matter that we don't do an uncertainty analysis. Nothing seems to matter.

MR. PARRY: Actually --

CHAIRMAN APOSTOLAKIS: I don't know when we'll have to worry about the things mattering anymore.

MR. PARRY: Right. I don't think that's true. And I think when we get to --

CHAIRMAN APOSTOLAKIS: Oh, come on.

MR. PARRY: And when we get to discussing these issues later on, I think you'll see that they do matter.

CHAIRMAN APOSTOLAKIS: Every single one that I mentioned is true, isn't it? They're proposing 2 to 5 now, not 10.

MR. HEYMER: I really --

MR. PARRY: Well, they're proposing that.

MR. HEYMER: -- struggle with the word we do not have a structured IDP process.

CHAIRMAN APOSTOLAKIS: Well, I don't see

it in the document.

MR. HEYMER: And we recognize that, among other things that the pilot plants identified, is we must give it more structure.

CHAIRMAN APOSTOLAKIS: Oh, okay. Well, if you're talking about something that has been improved and changed, that's a different story.

DR. ROSEN: Well, that comes to one of the base questions. You guys are going to have to come back, is that right?

MR. HEYMER: Yes. This is not the final product. We've got to --

DR. ROSEN: You agree it's not your final product.

MR. HEYMER: Right.

DR. ROSEN: It's a work in progress.

MR. HEYMER: It's a work in progress. It was put out there for the pilots to take and test and we recognize that in some areas, like in the IDP guidance, it needs to be strengthened. And we're going to do that. We've got some comments from the staff to incorporate. We've got error insights from the IDP and the process. And then we've got the staff's comments to incorporate. And then we'll be forwarding that back for sort of Rev. C.

DR. ROSEN: Well, maybe you ought to also look at what the staff is planning to do with the regulations in 50.69. Because there's no Appendix T anymore and yet B refers to an Appendix T.

MR. HEYMER: Right. Well, Rev. B was written in May last year when Appendix T was breathing. And now it's now. So, I mean, you know there's certain things that we need to adjust.

We are at an interim stage.

CHAIRMAN APOSTOLAKIS: Right. But I get the impression that both the staff and you feel that a lot of things don't matter, but I feel they do. Or at least I'm asking -- no, I'll take that back.

What I'm saying is just demonstrate that they don't matter. Please take the time to demonstrate they don't matter.

MR. HEYMER: Or have a basis for the w to 5 as opposed to --

CHAIRMAN APOSTOLAKIS: Yes.

DR. ROSEN: And to be fair, George, I think we have to give the staff it's chance to tell us what they think about this document. We haven't done that yet.

CHAIRMAN APOSTOLAKIS: No, they are supposed to jump in whenever they disagree with the

industry is saying.

DR. ROSEN: Oh, they are? Okay.

CHAIRMAN APOSTOLAKIS: That's what they told me, right?

MR. REED: We haven't got to the specific item yet.

CHAIRMAN APOSTOLAKIS: Yes. They're not going to have a separate presentation. Just jumping in. Silence means concurrence.

DR. ROSEN: No. I think what Tim Reed said was, Tim said they hadn't gotten to the specific issues yet.

MR. REED: Well, some of the specific issues are concerned with the IDP, we're not to that yet. We're not to the particular question yet, and then we'll jump in.

MR. MOIENI: George, this is one of the reasons --

CHAIRMAN APOSTOLAKIS: You have to speak to the microphone.

MR. MOIENI: Oh, sorry.

CHAIRMAN APOSTOLAKIS: That way you have volume and identify yourself.

MR. MOIENI: I don't know how to change the volume. I don't know yet.

CHAIRMAN APOSTOLAKIS: You don't know who you are?

MR. MOIENI: This is Parvis Moieni.

CHAIRMAN APOSTOLAKIS: Okay.

MR. MOIENI: I think I have a response to at least the criteria, where we draw the line. Because we did the risk-informed IST a couple of years ago, the criteria for Fussell-Vesely was .005 or 1.005. And when we did the exercise and identified the low safety significance, pumps and valves, to basically increase the interval. While testing interval we realized with that line we could not meet the criteria in 1.174 on the delta CDF and LERF. So, one of the options was not to do anything or basically to stay with whatever we did in terms of having low safety significance, or go back and revisit the screening.

So to make a long story short, we reduced it to .001 in order to meet the criteria for the delta CDF and later LERF. So even though the code case in ASME said .005, we used .001.

So this is a response to your question that we really, even back then, we didn't know that this came from the Bible and said this, this is .005. So we had to change it and redo the categorization,

redo the Fussell-Vesely and RAWs and some of the low safety significance went back to --

CHAIRMAN APOSTOLAKIS: Well, that's the kind of thing that I would like to see, that's a sensitivity analysis that I would like to see in the study that I'm proposing. You know, how sensitive are these things?

And now when you tell me you reduce it by a factor of 5, right?

MR. MOIENI: Yes.

CHAIRMAN APOSTOLAKIS: From .4. That brings up again the issue of uncertainty in the importance measures. Does that go completely outside the distribution of the Fussell-Vesely. I don't know. I've never seen any study like that.

I'm sure you guys are doing things when things don't work out the way they're written in the documents. But why would it be, you know, so difficult to do a study that looks at all these things as says, look, there are certain conclusions that we can draw and certain approximations that are valid most of the time, and let's go ahead and use them.

I mean, when the reactor has proposed approximations like the prompt jump on approximation and all that stuff, they actually documented that they

were approximations. Why can't we do the same thing in PRA? And I'm sure in other sciences like material sciences they do similar things.

DR. KRESS: No, that's exact.

CHAIRMAN APOSTOLAKIS: Anyway, I think you got the thrust of the comment here.

DR. ROSEN: Could I ask a question on a slightly different subject here, and that is that there is something in 00-04 that leads me to the conclusion that if the independent panel decided that they wanted something to be in not safety-significant, that they couldn't just do it, put it in not safety-significant no matter what the PRA said?

It seems the independent panel can override the PRA results. There's no specific expressed prohibition against that that I see.

MR. TRUE: It can only move it up. It can't -- the IDP cannot move down.

DR. ROSEN: Can you point to where that says that in here?

DR. SHACK: It doesn't say that.

DR. ROSEN: No.

DR. SHACK: It says it can move it down.

CHAIRMAN APOSTOLAKIS: Yeah, in fact, that was one of my questions. I saw it somewhere. I don't

remember where now. But I remember SDP said that --

DR. SHACK: Right. SDP --

CHAIRMAN APOSTOLAKIS: -- the panel can never bring it down. But in your documents I think they can do it.

MR. TRUE: I think they can only do that if there --

CHAIRMAN APOSTOLAKIS: Now, where did I see that.

MR. TRUE: -- is a set of circumstances.

DR. SHACK: Yes, they have to justify it, but they can do it.

MR. TRUE: This flow chart is intended to reflect --

CHAIRMAN APOSTOLAKIS: Ah. On page 6 of the letter to Mr. Pietrangelo by the staff, question 7 says there is a need to provide guidance about what authority the IDP has for making a determination that an SSC is low safety-significant when the PRA indicates the SSC is safety-significant. So I'm sure the staff had some basis for writing this.

MR. TRUE: What this flow chart shows --

DR. ROSEN: Perhaps could be focused a little bit.

DR. SHACK: It's on page 29 it's the "if"

statement.

CHAIRMAN APOSTOLAKIS: Okay.

DR. SHACK: If the IDP determines that this in many cases special treatment will have low or no impact on such SSCCs, which meet the criteria, if the IDP terms this is the case, it may decide to classify the SSC as low safety-significant.

MR. TRUE: Sorry. What page is that?

DR. SHACK: It's page 29. It's the second paragraph from the bottom.

MR. TRUE: 29 and 30 are not --

DR. SHACK: I think what's it's saying is that if it's meeting only because you've done such a conservative analysis that you've thrown it way up, they can then sort of argue it back down.

MR. TRUE: Well, this particular paragraph has to do with SSCs that strictly got in on the basis of high Fussell-Vesely and high failure probabilities.

DR. SHACK: Right.

MR. TRUE: Because what happens is, the thing we were concerned about with that particular paragraph was that often times you will have a base CDF and there'll be a particular type of scenario that is relatively important. And the PRA analyst will add a recovery action of some kind which may invoke the

use of a system, import kind of a screening value on that HEP and thereby bringing in the SSC as important.

An example might be refilling the RWST for a steam generator tube rupture or lining fire water for injection of certain cases.

It's given a conservative high HEP or high failure probability, but it happens to address more than the half of percent of the total CDF. And it brings the sequence down in the process by -- that recovery, it brings the sequence down in the mix still above a half percent of the contribution. But it's really kind of a screening approach to how important that thing is. And we didn't think it was fair to make those things get the same level of significance if they were already treated conservatively with their failure probability as something else that's being modeled in a way and structured in the model.

Really only focused on that particular set of high failure probability and recovery action type things. It was something that was raised actually as part of the BWR pilot not because it applied directly to the systems they looked at, but because they identified this could be a problem in future applications.

So, that statement only applies to that

narrow set of circumstances.

Now, if we go to the flow chart that we used for the IDP, basically what we asked the IDP to do is to make sure that we've got the right functions both to -- and core damage included. This kind of talks to the way Tom was referring to in the IDP, understanding how we've reflected the SSC. Then we go over all the information on the basis for categorization; the importance measures, the defense-in-depth assessment, different hazards, how we addressed all of those. And then their decision is is the SSC reflected appropriately? That's really the decision they get to make.

And if they think it's --

DR. KRESS: Well, does that mean to say is the SSE categorized appropriately?

MR. TRUE: No. Is the SSC is reflected appropriately in the inputs to the categorization process? Have we got --

DR. KRESS: Oh, you got all the things that bear on that SSC?

MR. TRUE: Yes. Right.

DR. KRESS: Okay.

MR. TRUE: And if the view it reflected appropriately, then basically if it's identified as

risk significant, it stays risk significant and all they're doing is confirming that we got the right attributes and that they understand the attributes.

If it's found to be low safety significant, then they're asked to look at the risk information in more detail. They asked to look at -- and the basis behind why the thing was found to be low safety-significant. They'll look at defense-in-depth and safety margins. And then they're asked to make a judgment about should it really stay RISC-3, but they're given the flexibility to say no, I don't think it should be RISC-3, it should go back up to RISC-1.

DR. SHACK: My problem with your viewgraph is it doesn't seem to me to reflect the South Texas experiences where the IDP actually classified most of the components, you know.

This sort of focuses on what they're doing when they get the PRA input and the PRA has sort of done some preliminary classification. There seems to be very little guidance for how they're to deal with the components that aren't in the PRA in this current version compared to the much more structured process I thought we got from STP, where they immediately realized that they were going to be doing a lot of the categorization for things that weren't explicitly in

the PRA. And this flow chart really, you know, you're thinking about things that are in the PRA when you're looking at this chart, I think.

MR. BURCHILL: I think the upper part of that chart is not at all restricted to PRA information. That is, in fact, all information that is gathered for the whole population of SSCs that are being considered.

MR. TRUE: In fact, we think that the five questions that STP asked are embodied in the flow charts and things that we use in the categorization process.

DR. SHACK: Then why not put them explicitly in is sort of my question?

MR. TRUE: Well, I think they are. We're going to get -- we'll get to that.

CHAIRMAN APOSTOLAKIS: Now let me see where we are here, because --

DR. ROSEN: Well, let him answer the question; why not put it in explicitly?

MR. TRUE: I think it is. These are the five questions. And the first question has to do with is it an initiating event. In the flow chart for consideration of events related to internal events, we have a question that says can the failure of this

component cause an initiating event. Okay. What we call a --

DR. ROSEN: Where?

MR. TRUE: -- a complicated initiating event.

CHAIRMAN APOSTOLAKIS: I didn't see it in there.

MR. BURCHILL: I think it's 244. 244 page 27 on the right side of that flow chart. Actually, it's at the top of the flow chart, the diamond to the left and it's on the right side of the flow chart relative to the complicated initiating events.

MR. TRUE: Now, we did qualify it a little bit more than South Texas did and not say all initiating events. But we asked if it wa a complicated initiating events and those which had an importance greater .005.

DR. ROSEN: How did they know that up front when they're at that stage?

MR. TRUE: The categorizers that are providing information to the IDP will know that.

DR. ROSEN: Know that? The categorizers will know that at that stage?

DR. SHACK: But see, that again means

we're dealing with components that are in the PRA.

CHAIRMAN APOSTOLAKIS: The PRA, yes.

MR. TRUE: Well, if it's not in the PRA -- well, it's either explicitly or implicitly in the PRA. Implicitly includes the fact that the component's failure could have effect on something modeled in the PRA.

I mean, balance plant piece of equipment that could cause a loss of turbine trip, we only have an event that's a turbine trip event. That doesn't have all the possible components. But those components are implicitly in the PRA because they're part of the turbine trip initiating event.

If a component has a function that's totally independent of -- could create a challenge to the plant or mitigating it, then it's not going to be in the PRA and asking that question will it cause an initiating event because it has nothing to do with it.

DR. SHACK: Well, I just have the feeling that phrasing the question this way versus the South Texas way gives a very different focus on what the panel's looking at.

CHAIRMAN APOSTOLAKIS: Yes. But you said I thought earlier, Adrian, that Rev. C will provide some more structure, is that true?

MR. HEYMER: Well, Rev. C will pick up some of the comments and the comment that Dr. Shack mentioned about well if it's not modeled in the PRA, is there guidance. And one of the feedback, we certainly I think -- we had -- and correct me if I'm wrong, Jason, from the Wolf Creek and I think from the Quad Cities was specifically in that area that we need to add something a little bit more explicit in the guideline, what to do with components that aren't modeled in the PRA as regards to guidance for --

CHAIRMAN APOSTOLAKIS: So you wouldn't do something like --

MR. TRUE: There will be some more. Particularly if they have this notion of implicit --

DR. ROSEN: And you're telling me that there's protection against the IDP overriding the PRA results and built into the structure. But I would be more comfortable if in the wording of this thing it made that absolutely clear and even referred to the diagrams to say how that result is obtained by correctly flowing through the diagram in the process.

MR. TRUE: Okay. I think that's a fair comment.

MR. BURCHILL: I don't think Tom finished.

MR. HOOK: I just had a couple more points

on PRA quality.

CHAIRMAN APOSTOLAKIS: Let me say that I think I'm going to lose at least one member at 12:00. We have really addressed several of these questions in the last 15 minutes. Maybe we can address the questions that we have touched yet, like the fire. I mean, we touched it earlier, but there were specific questions how conservative it is and so on. And anything else where you gentlemen disagree with what the thrust of the question was? Because otherwise I don't see how we can wrap this up in a reasonable amount of time.

And the other thing is since you are revising this, I wonder does the staff want us to write a letter this time? Would you like to see a letter from us? So we have to decide that ourselves without input from an expert panel.

MR. REED: We're going to have to give that some thought.

CHAIRMAN APOSTOLAKIS: Sorry?

MR. REED: We're going to have to give that some thought.

CHAIRMAN APOSTOLAKIS: Give it some thought, yes.

So, if it's okay with you, I'd like to

destroy your presentation and jump to things that -- I mean -- you can handle it.

MR. REED: Okay.

CHAIRMAN APOSTOLAKIS: Okay. So now, Doug?

MR. TRUE: Yes.

CHAIRMAN APOSTOLAKIS: Shall we go to -- I mean, I think we disagree on the sensitivity analysis and uncertain. I mean, all I'm saying is I'd like to see a study that confirms that what you're proposing is indeed reasonable, you know, instead of doing these sensitivities and arguing that fifth and 95th percentile -- I mean, gee wiz.

MR. TRUE: Maybe I should put this a little bit more directly. In my mind the purpose of the sensitivity studies and the raising and lowering of values across the board is a way to exercise the model to see if there are opportunities because of changes in evidence or information that SSCs are going to break one of those thresholds.

CHAIRMAN APOSTOLAKIS: But it seems to me that what you said earlier this morning is really where the proper role of sensitivity studies is. If there is a model uncertainty, I would be happy to see those things. But see them on failure rates, I mean

when we can propagate that uncertainly in a travail manner, I mean I don't know that that makes any sense.

MR. TRUE: Right. Maybe we should --

MR. HEYMER: And Bob -- Bob Lutz from Westinghouse. In the AP600 didn't we look at uncertainty and sensitivity and if we go to what follows question nine?

MR. LUTZ: This is Bob Lutz from Westinghouse.

I had prepared with the help of one of my colleagues back at Westinghouse sort of a summary of what went on on the AP600 new plant application a couple of years ago where we did do a full uncertainty analysis in that submittal as part of the documentation for the design certification. And we also did a number of sensitivity analyses. And I tried to summarize on one slide.

We did the uncertainty analysis to try to look at the CDF and LERF and make sure that we did not have a large variation in CDF and LERF between the mean and the 5th and the 95th percentile values. And what we found is obviously specific to the AP600 design, but what we found is that between the mean and the 95th and the mean and the 5th percentile values, that we didn't see more than about a factor of 3

variation in the overall core damage frequency or LERF numbers.

We also did a number of sensitivity analyses, much more than what is being proposed here in the Option 2 framework that's in NEI 00-04. And, again, this is all documented back in the licensing analyses. But we didn't see any SSCs coming from a negligible contribution to LERF or CDF becoming a dominant contributor when we did these sensitivity studies.

In other words, nothing that had a RAW value or an F-V value close to 1.0 changed to a significant RAW or F-V value when we did the sensitivity analyses. Now, that's what's documented and it's -- within what we did, we didn't document it in any of the licensing analyses, but within our how house back when we were going through this.

We also looked at RAWs and F-Vs at the 5th percentile and 95th percentile level. And, again, found the same thing; that nothing that had an RAW value, for example, near 1.0. In the mean case when we went and looked at the 5th or the 95th percentile case, nothing jumped up. So we had some confidence on that application that nothing that was in the grass or down in the background using the mean value would jump

up when we did sensitivity or uncertainty analyses.

And that's I think probably one of the extensive comparisons that we do have to date of sensitivities and full uncertainty analysis. I brought this along just for what it's worth.

And, again, the plant design's a little bit different, but it does show that in this one case that there was no significant differences.

CHAIRMAN APOSTOLAKIS: Well, that's good to know. But that was not in the report, and that's part of what I have in mind as -- there is this paper in the proceedings of the PSA conference '96, which you are probably familiar with already.

MR. TRUE: Quad City meeting?

CHAIRMAN APOSTOLAKIS: Yes. "Consideration of Probabilistic Uncertainty and Risk Based Importance Ranking." And the distributions here are Fussell-Vesely and RAW, and all that. I mean, something along these lines would be helpful, you know. This was done by graduate students. So maybe you want to know which one it is, or you want a copy now? We can give you a copy.

MR. TRUE: A copy would be great.

CHAIRMAN APOSTOLAKIS: Okay. We'll make copies and hand them out.

MR. TRUE: Probably just the authors' names and I can pull it out of the proceedings.

CHAIRMAN APOSTOLAKIS: Modares and Agerwal.

MR. TRUE: I can't find that.

CHAIRMAN APOSTOLAKIS: It's PSA '96, page 230.

MR. TRUE: Even better.

CHAIRMAN APOSTOLAKIS: Volume 1.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: And other things. I mean, as I say, that paper by the distinguished members from the NRC staff in reliability engineering, which you probably have, would probably be a good one to look at. You have that? "Use of Importance Measures in Risk-Informed Regulatory Applications"?

MR. TRUE: Yes. Yes.

CHAIRMAN APOSTOLAKIS: You have it and you promptly ignored it, right?

MR. TRUE: I didn't think any of us ignored it.

DR. SHACK: I mean the one that shows the point estimates are very close to the mean.

CHAIRMAN APOSTOLAKIS: Yes. And also talks about the advisability of using the thresholds

as they are. Yes.

DR. ROSEN: So now where are we, George? To the NRC staff?

CHAIRMAN APOSTOLAKIS: Well, let's talk about external events, because that's really something that I think bothers us. And we had a question or a couple of questions, at least, on --

MR. TRUE: I have to say I didn't get the same impression from reading the questions as I've gotten here today. So, take me to the question that you think --

CHAIRMAN APOSTOLAKIS: Well, question 16 and 17.

MR. TRUE: Okay. Sixteen, I missed -- understood what you were asking about. I thought you were asking in 16 about places where we had PRAs available, how do we handle them quantitatively. And the answer was we looked at them individually and then we compute these integral importance measures using this equation. That's just basically weighting it based on the CDF contribution of each hazard.

And then the sensitivity study we've talked about looks at that.

So there must have been something more to this question than I read from it.

CHAIRMAN APOSTOLAKIS: Well, go on to 17.

MR. TRUE: Okay. So then 17 question is focused on fire versus fire PRA.

CHAIRMAN APOSTOLAKIS: So let's look at these two figures now. 3.1-2. You don't have a transparency, do you?

MR. TRUE: Yes, we do.

CHAIRMAN APOSTOLAKIS: Oh, great. Let's put it up because that's important.

MR. TRUE: 3.1-1 and 3.1-2. Okay.

CHAIRMAN APOSTOLAKIS: Okay. Good.

MR. TRUE: This figure is effectively the same as the internal events figure with the exception that I loped off the initiating event question because individual components aren't really contributors to initiating events in the same way the fires as they are for other internal events.

So basically the questions are is the RAW greater than 2 or Fussell-Vesely greater than .05. If it is, can it have been safety significant --

CHAIRMAN APOSTOLAKIS: Now let me understand this. When you say calculate draw in Fussell-Vesely for components addressed in 5 PRAs --

MR. TRUE: Yes.

CHAIRMAN APOSTOLAKIS: -- are you doing it

now with respect to the contribution to core damage frequency from the fire --

MR. TRUE: From the fire.

CHAIRMAN APOSTOLAKIS: Not for the whole thing?

MR. TRUE: From the fire and then at the end we come back and take that important measure --

CHAIRMAN APOSTOLAKIS: And you weight?

MR. TRUE: And weight it and compute overall.

CHAIRMAN APOSTOLAKIS: Now, again, I mean that -- it sounds reasonable, but why is that something we want to do? I mean, the whole idea of the importance measures is to look at the whole PRA as one entity and say this is the ranking. Right now we are breaking it up and say no we're going to do a separate one for fires, earthquakes, internal events and then somehow put them together.

MR. TRUE: Right.

CHAIRMAN APOSTOLAKIS: I mean that's more defense-in-depth it seems to me. So it's okay, but --

MR. TRUE: It's more defense-in-depth, it's more conservative because we're breaking it apart and looking at individual pieces. But at the end we bring it back together and when we pass the

information to the IDP, we give them both contexts. And basically what we said is if something is important from an internal events perspective when it's isolated by itself, it's important.

In my opinion we have a lot of confidence, a lot of experience with importance measures and internal events PRA. If we found that the importance was high for another hazard source, then we give the IDP that value plus the aggregate, which is the -- or integral, which is the combination importance measure. And if that fire or fire, for example, was a small contributor to the total CDF, then we allow it to be kind of diluted. But if it's a large contributor, it's still going to be a significant importance measure at the end, and we think that it deserves that weight.

But if we combine them altogether and you have a plant, for example, like Quad Cities that has low internal events CDF and moderate fire CDF, then nothing relating to internal events is ever important because it's always swapped out by fire. And the only things that are important are the fire mitigation systems. And we didn't think that that was appropriate because the basis on which you do fire PRA is totally different than the basis on which we do the

internal events. And the uncertainties are different, the input assumptions are different, and they're just different beasts we felt deserved being separated apart.

Within internal events we made an allowance for the fact that if you were dominated by some unique hazard like internal flooding, we said you should pull that out and look at everything absent that so that you don't swamp out the plant responses and the defense-in-depth that's integrated in your ability to respond to traditional initiating events by this big lump that's a particular vulnerability to an internal flooding or some unique hazard.

MR. BURCHILL: Let me add to that. As you know, Quad Cities is one of my major challenges 4 years ago when I came to ComEd. And the fire PRA, which is a overstatement, of course, that existed at the time showed a hideously high core damage frequency. And when we examined it, even casually, we found that it was extremely poorly structured.

CHAIRMAN APOSTOLAKIS: But now let me come back to what you and Doug were saying earlier this morning about all these reviews and these engineers who are reviewing the risk management programs and so on, and that these -- we have high quality. How come

in that case --

MR. BURCHILL: It was a terrible product-

-

CHAIRMAN APOSTOLAKIS: You mean the process was terrible as terrible?

MR. BURCHILL: The process that developed it was a terrible process.

CHAIRMAN APOSTOLAKIS: So it was not what you described here?

MR. BURCHILL: It is not what I described this morning. It was not put in place since I've been there.

DR. ROSEN: When did you say that was?

MR. TRUE: It was the IPEEE?

MR. BURCHILL: The IPEEE for Quad Cities was developed in '96/'95. '95/'96 time frame. One of my first challenges when I arrived on the scene in January of '98 was to go look at this beast and find out what was it telling us. And, you know, as I say, even a casual examination showed me that it was very poor. And I will in no way even try to rationalize for you how it got prepared in the way that it was.

Now, when we went about to totally redoing that fire PRA, we did exert the types of controls that I described to you. But nevertheless, even with that

there were certain things that we did and did not do.

The major thing, of course, because fire is a highly spatially dependent hazard, is you have to know a great deal about all of your cable routings in order to know exactly what gets impacted by a particular spatially defined fire. And you have to know then what you can take credit for. You have to know both what the fire will impact so the fire modeling comes into effect, and you have to know where those cables are that are important to other pieces of equipment's operation, which aren't even in that spatial area. I mean, that's the whole challenge with fire PRA.

So we spent -- you know, I don't want to put this in numerical terms. But we spent a lot of money to go chase cables. But we only spent a certain amount of money. I mean, I won't say to you that I know where every individual cable chase in that plant. So in certain cases where we had a fire in a compartment, you know, if we knew where the critical pieces of equipment were that had cables through or where the cables were for critical pieces through that compartment, then we could explicitly model it.

If we didn't, then we just -- if we knew it entered that compartment but we didn't know

precisely where it ran -- and frankly, it was impractical to go track that down, we just assumed that we lost that piece of equipment. I mean, this is standard practice.

So, the fire PRA in my opinion at least suffers in comparison to the internal events PRA from two considerations. One is that the ignition frequencies for the first are nowhere nearly as sufficiently defined as our internal events initiating event frequencies. And in cases of absence of knowledge, we believe that we biased them in a high direction; in other words, a conservative direction.

DR. ROSEN: But not all plants had that problem of lack of knowledge of the configuration?

MR. BURCHILL: No, I understand that.

DR. ROSEN: Some plants knew precisely where the cables are.

MR. BURCHILL: Some plants do. Some.

And then the second part is that point; that the adequacy of your fire PRA to show a CDF that's comparable to your internal events absolutely depends on your intimate knowledge of those cable routings.

So it's two things. It's the ignition frequencies themselves and then the adequacy of the

cable routing knowledge so that you can do the fire modeling.

Now, absent that I would submit to you that if you have a -- and you'll challenge me on this -- but a reasonable representation of the plant, although still somewhat conservative, you can still gain a great deal of information about what pieces of equipment are really important for mitigating the fire. And so now on relative basis I can look in my fire PRA and I can say, you know, what are the importance measures associated with equipment. And that will tell me how important the equipment is on a relative basis for responding to fire. But I wouldn't pretend it to be directly comparable to the same importance majors coming out of the internal events PRA. You see what I'm saying?

And that's, I think, another reason for separating this. Because you can gain information out that fire PRA that's helpful to understand the importance of equipment. And as Doug said, it could go either way. You could either lose that information or it could swamp the internal events if you lumped them altogether, because they're not on the same playing field. And I would submit there's very few PRAs in which they are on the same playing field.

CHAIRMAN APOSTOLAKIS: Which essentially comes down to how uncertain you are about the fire PRA results really. And it's one way of --

MR. BURCHILL: And how you dealt with that.

CHAIRMAN APOSTOLAKIS: It's one way of handling.

So let's answer the question that was raised.

MR. CHEOK: Actually, let me supplement what Bill and Doug just said.

By separating the initiators we can gain insights we cannot gain whereby lumping them. In essence this kind of maybe relates to question 5 on sabotage.

What happens when we have an event that maybe could make a fire event more important, by having this separate pieces of importance measures, you can now deal with question 5 a little better maybe.

CHAIRMAN APOSTOLAKIS: Well, the only thing that worries me is that -- I mean, this is reasonable. I don't recall in 1.174 having anything like this unless you tell me to go read Appendix X.

MR. CHEOK: I think if you read Appendix

A --

CHAIRMAN APOSTOLAKIS: Oh, God.

MR. CHEOK: We do say that you need to treat the importance measures cumulatively and separately because each will give you a different insights.

CHAIRMAN APOSTOLAKIS: Could you point me to the page. I'd like to see that. And also it's not just a matter of importance measures. I mean, I think in general when you do risk-informed applications, shall we start doing this in a consistent systematic way and say now you have to separate fires from internal events and do certain things? Let's not what the basic approach says, right? I don't think -- I mean, if you look at the figures in 1.174 --

MR. TRUE: It's total.

CHAIRMAN APOSTOLAKIS: It's total. It doesn't say, you know, consider things separately. It may be buried in Appendix A, something --

MR. CHEOK: But remember we are saying that importance measures are not your decision making tool. You see a delta change that is, the importance measures are things that you bring into the IDP for them to deliberate on.

CHAIRMAN APOSTOLAKIS: Right. Right.

MR. CHEOK: These are insights you bring in to the IDP. And I think we mentioned it this morning in terms of defense-in-depth. You know, a RAW value basically tells you SSCs that are in single, double or maybe triple event cut sets, so you're talking about things that are maybe sensitive to defense-in-depth in terms of levels of protection.

Fussell-Vesely would tell you whether an SSC appears in many different cut sets which tells you that, you know, it's there to mitigate a lot of different functions.

CHAIRMAN APOSTOLAKIS: My point was that if you look at the basic diagrams that are in the main body of 1.174, there is no distinction between parts of PRA that are done poorly or very conservatively versus other parts that are not done that way. There is one global delta CDF that you have to consider. And now what I'm saying is that, you know, this sounds reasonable to me. Maybe that idea of treating certain things differently from others should be studied more carefully and maybe change the basic approach. Because I don't know what delta CDF means. Now if we do it for fires or for something else in light of what Bill just told us.

Anyway, that's an idea. Let's go back to

the question here. Where is the corresponding, you know, that diamond you have there are all greater than 2?

MR. TRUE: Right.

CHAIRMAN APOSTOLAKIS: If I go to the next figure --

MR. TRUE: Okay. Let's go and we have one there, too. Okay. What we did here is -- well, let me back up.

In our five analysis we start with a fire scenario and you look for factors which can allow you to screen that fire scenario out. And screening it out means that its frequency gets below one times 10^{-6}.

So you say I'm going to have a fire in this area, it causes this much damage, what are the things that are left and what are the systems that could suppress or terminate that scenario. And once you've gotten that scenario below 10^{-6} you stop. You don't continue to recover it to try and refine into a true CDF. You just screen it below 10^{-6} and say I don't have to worry about it anymore. It's not a vulnerability in my plant. That's what fire was really intended for is to identify vulnerabilities.

And so when you're all done you end up

with screened scenarios and unscreened scenarios. Unscreened scenarios are those that you could never get below 10^{-6} even though you incorporated all the success paths and information that you had available.

And so what we said was that for a component that participates in an unscreened scenario, it's used to mitigate -- an unscreened scenario, so it's part of a scenario, it's built into my 6, it's automatically safety-significant. I don't care if it's --

CHAIRMAN APOSTOLAKIS: It's a candidate?

MR. TRUE: It's a candidate. Well, it's safety-significant and then whether it's safety related or not makes it a candidate of RISC-1 and RISC-2, and that's passed on to the IDP to make the final decision about.

DR. ROSEN: And even the IDP and all its glory can't change that?

MR. BURCHILL: That's right.

MR. TRUE: Right.

CHAIRMAN APOSTOLAKIS: So let me understand --

MR. BURCHILL: And it can't ever get to RISC-3?

CHAIRMAN APOSTOLAKIS: It can never get to

RISC-3?

MR. TRUE: Right.

MR. BURCHILL: Right.

MR. TRUE: Okay. So then we're left with what about all those ones that you squeezed below the 10^{-6}? There could be a bunch of them and the risk could actually be large. And so what we said there was that if it doesn't participate in one of those scenarios, then we're going to make it low. So what we're saying is it didn't really have anything to do with fire risk. But if it does participate and it was part of the reason you were able to screen it below, then we ask if you didn't credit that, would you bring that scenario back above the threshold and make it an unscreened scenario.

So it's sort of like a risk achievement kind of a look at it to say if I don't credit that as a I come out of this box and move back into this other box over here, where we said everything was important, so we're taking all the things that participated in the unscreened and all of those that helped to screen out scenarios and putting those back in. So those come back down and, again, are RISC-1 or 2.

MR. PARRY: Can you walk me through George's door?

MR. TRUE: The barrier, I think what I said about barriers was that you would have to have a fire PRA -- I think what the guidance is you have to have a fire PRA that was focused on looking at that barrier which would take you back to the other figure and we wouldn't be using this figure. And I think you would use the same process and basically say --

MR. PARRY: Most people don't have a fire PRA that looks on barriers.

MR. TRUE: Right.

MR. PARRY: Okay. So what do they do with barriers?

MR. TRUE: They are not allowed to -- they don't have a compelling case to move it from safety related, a/k/a RISC-1 to RISC-3. So it remains RISC-1. Or it remains under whatever program it's in. It may actually be in an augmented program, in which case it starts in RISC-2 and stays in RISC-2.

MR. PARRY: So we've got what? A thousand fire barrier penetration seals that are always going to be in a high risk category, RSC category?

MR. TRUE: Safety-significant category?

MR. PARRY: Yes.

MR. TRUE: Yes. Without having done an analysis to show that they are, they remain in the

safety-significant category.

MR. CHEOK: Unless you can show that they are not important in screening out of the sequences in your fire screening analyses. In other words, if you had used the barrier to justify fire independence, you have to maintain the current programs unless you can show that even if you remove the programs, the screening does not matter.

I think the staff also has one more question with respect to this figure, and it's a little more subtle than just the typical barriers when you do screening. When you go to the PRA leg of this figure a lot of people would define fire damage states. And when you define fire damages states, you take credit for things like fire suppression systems, sprinklers, response from the fire department, wherever.

MR. TRUE: Right.

MR. CHEOK: And that gets to be put into your split fractions in your fire damage stated entries.

MR. TRUE: Right.

MR. CHEOK: That things don't normally get propagated to the final cut sets because in your final cut sets you come in with a single event where you say

it's damaged stage 3 -- where you have, you know, a large fire that is suppressed in 3 minutes. So in essence when you have -- when you take credit for suppression systems, that seldom gets propagated to the importance measures, and the staff has a question for NEI on that.

MR. TRUE: I'm not familiar with your question, because I frankly haven't taken the time to go through all your questions on top of these 23. But what I'll say about that is that I believe we can use the same -- I agree with you that it's uncommon to see those show up in traditional importance measures, but I believe that we can use the same basic importance measure concepts, RAW 2, Fussell-Vesely and .05 for those systems. It just would take a separate calculation to look at what the benefit you're getting out of those systems is.

MR. CHEOK: I think this is something we need to discuss more. Because we define a lot of our runs over our fire property runs by using certain parameters like suppression systems and I'm not sure if that actually gets propagated all the way to the-- or can get easily propagated to the importance measures. But that's something we need to discuss more.

MR. TRUE: Okay. It's probably a place like where we need more -- maybe we could use more guidance than the guidance document.

CHAIRMAN APOSTOLAKIS: And all this assumes, of course, that whoever did the 5 kept track of the screen scenarios, right? If they have not, they cannot apply this. Do they keep that information?

MR. TRUE: Yes. Yes. Yes, as part of the 5 processes.

CHAIRMAN APOSTOLAKIS: How about if you do the HCLPF in -- what do they call that, in seismic?

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: It's the same idea?

MR. TRUE: It's the same basic concept in that what we're saying is that the seismic margins approach was intended to make sure we didn't have any vulnerabilities to seismic risk. And in that process you were required to have two safe shutdown paths that you had -- 1 is the PRA one which looks like every other PRA one.

Basically what we said there was that if you have identified that component as being part of your safe shutdown paths in your safe shutdown analysis for seismic margins, it is -- if it supports

the safe shutdown path, then it is safety-significant.

If it's not something that's important to one of your safe shutdown paths, then it's not and it goes to a --

CHAIRMAN APOSTOLAKIS: And if you do all this, you cannot really develop the integral -- what you call the integral form of importance measures because you don't have a CDF, right?

MR. TRUE: Right. And you -- that aggregate calculation and the sensitivity study at the end will vary by a factor of 2 to 5. Obviously doesn't get factored back in here.

CHAIRMAN APOSTOLAKIS: So how does that work now?

MR. TRUE: But the --

CHAIRMAN APOSTOLAKIS: In other words what you just said is, if I understand correctly, that we cannot really calculate delta CDF?

MR. TRUE: For the seismic contribution.

CHAIRMAN APOSTOLAKIS: Oh. So we don't know whether we meet 1.174, do we? Especially given the fact that these things are among the significant contributors a lot of the time.

MR. TRUE: But all of these -- what we're -- all of these that are credited are going to remain

treated. So it's the ones that aren't on the success path that are possibly be moved to RISC-3 or 4. If they make it through all the other screens and those aren't what we need in order to assure that our seismic risk is low.

So the ones that were included to make sure our seismic risks are low, stay safety-significant.

CHAIRMAN APOSTOLAKIS: Right.

MR. TRUE: So it's the ones that are not part of that that are kind of marginal helpers in the seismic risk area, you may want to look at it.

CHAIRMAN APOSTOLAKIS: Yes.

MR. TRUE: Those are the ones that potentially might change by a factor of 2 to 5.

CHAIRMAN APOSTOLAKIS: Right. And that we don't know the impact.

MR. TRUE: And those are the random failure rates anyway of the components that we're changing by a factor of 2 to 5. So, yes, we're missing a small slice of the delta CDF, but we felt like because we were taking everything on that path, that --

CHAIRMAN APOSTOLAKIS: That's an interesting point you just made. In these analyses,

for example, in the seismic analysis we had the ragility curves, right? When you do you 2 to 5 calculation, you don't touch those, do you? Because they're not --

MR. TRUE: We were going to change just the random unreliability --

CHAIRMAN APOSTOLAKIS: Only the random? Oh. Okay. Interesting.

Okay. Anything else on the questions?

MR. TRUE: We had a lot of discussion about this, is it conservative, is it not conservative?

CHAIRMAN APOSTOLAKIS: No. I think the way you describe it is conservative, that's my impression. The way you describe it here.

MR. TRUE:

DR. SHACK: Well, we tried. It was actually our intent. Good.

DR. SHACK: Well, I'm not sure in this one, though, if you had a relatively large seismic contribution, that you could be sure that the delta CDF with the other paths were small. You know, it becomes -- it's one of these thing where the -- yes, you've gotten the largest one and you've made it manageable, but it's not clear to me that the delta

CDF associated with the others is necessarily small. It's just -- it's not dominate.

You know, in the 5 at least you've got a 10^{-6}. You know, a have a quantitative criterion for what you've screened out.

MR. TRUE: Yes.

DR. SHACK: In this one all you know is that, you know, it's less than the two that you've picked.

MR. TRUE: Yes. I think that my impression, and I'm not the seismic expert for sure. My impression is that if you're able to meet the HCLPFs in the seismic margins approach, that you can have reasonable confidence that your total CDF from seismic is going to be on the order of 10^{-5}. And so -- and that's for the things that are treated.

Now, you may be actually above 10^{-5} if your HCLPFs didn't meet the earthquake, but we've already got all those components that didn't meet the HCLPF because they're a part of our safe shutdown path for making it safety-significant.

So we're talking about some change to a fraction of the 10^{-5} kind of a value, which gave me some confidence that we're still kind of in that same ball park.

DR. SHACK: Yes. But if delta CDF is -- I mean, you know, it's a small contribution to the total CDF, but when you're looking at the deltas that you're interested in, is not -- you know, we're not looking at 10 to the 4th anymore. You know, if you're going to demonstrate that the delta CDF is small --

MR. TRUE: It's between 10^{-6} -- or less than 10^{-5} and, hopefully, less than 10^{-6}. Yes. But it's not all that --

CHAIRMAN APOSTOLAKIS: Shall we move on?

Now, in the common-cause failure area --

MR. TRUE: Yes.

CHAIRMAN APOSTOLAKIS: -- on question 20, which -- and 21 is blank. Oh. Okay.

MR. TRUE: We didn't understand that.

CHAIRMAN APOSTOLAKIS: Why should -- no, I thought your --

MR. TRUE: We didn't understand 21.

CHAIRMAN APOSTOLAKIS: Well, it's related to the comment I'm about to make.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: I think the implication in 20 or what you're doing in here is that the common-cause failure term is a separate event because in RAW and Fussell-Vesely can be calculated.

In other words, I have a PRA, I have --

MR. TRUE: What you said is statement of the facts, right?

CHAIRMAN APOSTOLAKIS: Yes.

MR. TRUE: That's true.

CHAIRMAN APOSTOLAKIS: And the thrust of these questions is that it really isn't, but if this component A fails, it effects -- that fact effects a number of terms. I mean, when I calculate RAW and I set that component down, it should effect a term that has only random failures, it should effect the term has common-cause failures, because that component is down now.

MR. TRUE: Okay. Yes, but the --

CHAIRMAN APOSTOLAKIS: So we're not going to take the common-cause failure term as a separate entity, as if it were a separate component in other words?

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: So -- yes, go ahead.

MR. TRUE: Let's take it one at a time.

Fussell-Vesely is effectively setting the failure rate to zero, right?

CHAIRMAN APOSTOLAKIS: Yes.

MR. TRUE: So that takes the common-cause term to zero. So Fussell-Vesely I think we -- hopefully we can agree that the approach of considering all of those together addresses that.

CHAIRMAN APOSTOLAKIS: Considering what?

MR. TRUE: We take the sum of all t he Fussell-Veselys and assign that to be the Fussell-Vesely importance of the component.

CHAIRMAN APOSTOLAKIS: And that's bounding or what is it?

MR. TRUE: Well, I believe it's bounding.

MR. PARRY: It is, because they're independent failure modes of the component.

CHAIRMAN APOSTOLAKIS: Mutually exclusive. They're mutually exclusive.

MR. PARRY: That's right. But -- that's right.

MR. TRUE: Yes.

MR. PARRY: So the cut sets are mutually exclusive. So --

MR. TRUE: Unless by some chance you had--

MR. PARRY: Well, there may some --

MR. TRUE: -- the same component had to work one way and then work a different way.

MR. PARRY: But then it would be in a

different phase.

CHAIRMAN APOSTOLAKIS: So in essence what you're --

MR. PARRY: And you would get a different sequence.

I think it's true that it's the right way to do it.

MR. TRUE: Yes. It's the right to do it. It's certainly not --

CHAIRMAN APOSTOLAKIS: But you are talking about the Fussell-Vesely of a single component now that has 3 failure modes, right?

MR. TRUE: Right.

CHAIRMAN APOSTOLAKIS: You are not addressing the question of how to handle the common-cause term also?

MR. TRUE: I'm trying to do that.

CHAIRMAN APOSTOLAKIS: Okay.

MR. TRUE: So there's a figure -- the answer to question 22, what we probably should work from and then we'll get -- and you had a question about that table. Get the table out of the report and corrected an alignment problem that we had in the report, which I apologize for.

So basically what we did was we said okay,

in a PRA a component has various failure modes. Independent failure modes and common-cause failure modes. What we want to do in the area of Fussell-Vesely is we're going to compute a component in Fussell-Vesely importance, and for doing that we're going to take the sum of the individual component failure mode Fussell-Vesely importances. So these Fussell-Vesely importances sum to this .00952 value.

CHAIRMAN APOSTOLAKIS: So this is the sum of all these four numbers.

MR. TRUE: The sum of those numbers, yes. Because the decimal points align, it's not obvious that that's the case, but that's what it is.

DR. ROSEN: We'll trust you.

CHAIRMAN APOSTOLAKIS: Well, but wait a minute now. Let me -- the failure to open versus failure to remain --

MR. BURCHILL: Right. It's not physically possible that those both occur unless they're time dependent failure situations in a scenario. But at least we have -- that's why we think it's conservative because we've actually added what may be in fact mutually exclusive failure modes.

MR. TRUE: You can't fail or remain open-- shouldn't be able to fail or remain open and fail to

remain closed in the same -- at the same time.

DR. ROSEN: Well, if you get caught in the middle.

MR. TRUE: Well, you could, yes. Although that usually would be categorized as one failure or the other.

CHAIRMAN APOSTOLAKIS: But the common-cause failure again represents now what kind of failure? To open or to remain closed?

MR. TRUE: To open. To open. We don't usually have a common-cause term for failed to remain closed.

DR. ROSEN: Closed.

CHAIRMAN APOSTOLAKIS: And you have a -- oh, there was a number there. So the .004 is --

MR. TRUE: Is it's importance. That actually happens to be the most important of the Fussell-Vesely importances.

CHAIRMAN APOSTOLAKIS: So this Fussell-Vesely now is calculated by assuming -- by treating the common cause term as an independent separate term, is that what that means?

If I go to the PRA and I set that common-cause term equal to what, zero?

MR. TRUE: This term? Yes.

CHAIRMAN APOSTOLAKIS: Then it will get .004?

MR. TRUE: It will reduce the total by .004

CHAIRMAN APOSTOLAKIS: Okay. And as if nothing else happened?

MR. TRUE: Yes. There's a basic event in the model that says common-cause failure of these two valves.

CHAIRMAN APOSTOLAKIS: Right.

MR. TRUE: And I computed that with an alpha factor model or a beta factor model, or whatever model. But I have a basic event that says common-cause failure, this .004 reflects the Fussell-Vesely importance of that basic event.

CHAIRMAN APOSTOLAKIS: Although in reality, I mean if you use the alpha factor or the beta -- I mean the multiple Greek letter method, 1 and 4 really have the failure rate of valve A times beta and gamma?

MR. TRUE: Right. Right. Right. I agree.

CHAIRMAN APOSTOLAKIS: So they're really not independent basic events. I mean, you know, lambda appears in both?

MR. TRUE: Right. But if we're going to

zero, I think they all go to zero at the same time.

CHAIRMAN APOSTOLAKIS: They all go to zero at the same time. But that's not how you calculated the Fussell-Vesely. You set one versus equal to zero and then the other. You don't put them down at the same time.

MR. PARRY: George, maybe -- excuse me. The way you calculate them, they're not independent. But they represent independent failure modes of that component because the valve A fails to open is what's classified as the independent failure to open. Event 4 is that subset of those failure causes of valve A that would also fail all the others.

CHAIRMAN APOSTOLAKIS: Right.

MR. PARRY: So they are, in fact, independent events from the point of view of physics. It's just that when you calculate it by taking the lambda for 1 and multiplying by a few betas or alphas.

CHAIRMAN APOSTOLAKIS: But if you do that, I mean the importance of lambda is different. It also effects two terms.

MR. PARRY: Well, that's -- yes, but that's why they're adding them. They're not looking at the --

CHAIRMAN APOSTOLAKIS: Can they

demonstrate that if you add them, you get the correct result --

MR. PARRY: They're not looking at the importance of lambda. They're looking at the importance of the component.

CHAIRMAN APOSTOLAKIS: Right. And that's not something that's obvious to me. He just says that we are doing it this way without any justification. I have to sit down and figure it out myself if it's correct, and I don't like that.

MR. TRUE: You don't like that you had to figure it out?

CHAIRMAN APOSTOLAKIS: Yes. Because them I have to do the same for RAW. I have to understand every line you have here. And, you know, why should the user have to do this? Can you just explain why these things are reasonable? Somewhere.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: Okay.

MR. TRUE: We can explain that, why they're reasonable.

CHAIRMAN APOSTOLAKIS: Good.

MR. TRUE: The next one may be somewhat more contentious because I don't think the staff agrees with this completely.

MR. PARRY: You are right.

MR. TRUE: Okay. We've resolved the fact of how we calculate the component importance for Fussell-Vesely, right? That's clear what we're doing?

CHAIRMAN APOSTOLAKIS: Well, I understand what you're doing. It's just that it's not clear to me that it's reasonable what you're doing. But I understand what you're doing. Now let's go to RAW.

MR. TRUE: Okay. Let's go to RAW.

CHAIRMAN APOSTOLAKIS: But you said you can supply proof that it's reasonable. So, you know, I'll wait to see it.

MR. TRUE: Okay. For RAW in the PRA we have in the same individual basic events, and we can compute a RAW for each of those individual basic events. And we in our categorization process have said that we will not include the common-cause -- the RAW of the common-cause term as part of our computation of the total component importance from a RAW perspective and unless -- unless the conditional probability of the additional components failing that's used in alpha factor method is less than .005. And the reason for that is that if it's greater than .005, which in most cases it is -- it's usually around -- between .01 and .1, then the Fussell-Vesely is

going to be bounding anyway. Because the only way to get a RAW of 2 with a Fussell-Vesely lower than .005 is if the failure rate or the event that you're setting to true has a value that's smaller than .005.

CHAIRMAN APOSTOLAKIS: Doug, and you expect the reader to figure that out? Why don't you supply some arguments that this is --

MR. TRUE: There's a footnote that describes it.

CHAIRMAN APOSTOLAKIS: There's a footnote which I never understood.

MR. TRUE: Okay.

MR. PARRY: I have got to say I don't really understand the footnote either. Because I think it refers to the conditional common-cause failure probability, which is the product of the alphas.

MR. TRUE: Right. It does.

MR. PARRY: Yes. Whereas, in fact by using the same argument that you used to sum the Fussell-Veselys you can turn it around and say that you also have to consider each of these basic events when you're considering RAW. Because remember what these separate events are is they're separate failure modes, if you like, of the component. Therefore, why

would the common-cause failure -- the common-cause failure mode is a very strange one in that it also impacts other components. But it still fails component A, and therefore it's equivalent. So I think you should consider it.

CHAIRMAN APOSTOLAKIS: Isn't the problem stemming from the fact that item 4 is treated as a separate entity from 1 and 2? I mean, if you say the common-cause failure -- forget failure rates.

The term is QA times data.

MR. PARRY: Yes.

CHAIRMAN APOSTOLAKIS: Then I'll go everywhere in my PRA, I'm looking for the RAW of A. And wherever I have Q of A I'll set it equal to one.

MR. PARRY: You could do that --

CHAIRMAN APOSTOLAKIS: Clearly, I could. I mean, that's what I must do.

MR. PARRY: No, no, no, no.

CHAIRMAN APOSTOLAKIS: There's a difference between must and could.

MR. PARRY: No, not necessarily.

CHAIRMAN APOSTOLAKIS: Not necessarily.

MR. PARRY: Right. Because what you're assuming is that the impact of whatever change you're doing is only effecting the random failure

probability. It could equally effect the coupling factor between the components A, B and C.

CHAIRMAN APOSTOLAKIS: It could. It could.

MR. PARRY: And by doing what you suggest, but you're only focusing on --

CHAIRMAN APOSTOLAKIS: But it's a step in the right direction.

MR. PARRY: It's a step in the right direction.

CHAIRMAN APOSTOLAKIS: Because the component is down.

MR. PARRY: It's a step in the right direction.

CHAIRMAN APOSTOLAKIS: Yes.

MR. PARRY: But there is no right answer to this because RAW is itself a very --

CHAIRMAN APOSTOLAKIS: Oh, but there is a wrong answer.

MR. PARRY: Yes, and I think this is the wrong answer.

DR. ROSEN: This is the wrong answer and a --

MR. PARRY: But there's no right answer in the sense that RAW is such a strange extreme

importance measure.

CHAIRMAN APOSTOLAKIS: I want to know what happens to the CDF if this component is down. Now, in the community's wisdom the common-cause failure is represented by 2 times beta times gamma, times delta. Well, if I have accepted, then I have to go and set Q equal to zero, to 1 there. Now, whether beta, gamma, delta will also go up is another question. But I think I would go back to the comment that, you know, how much can they go up. Because they're already pretty high. It's the Q that really brings everything down by -- I mean, beta is 10 percent, gamma is close to one. I mean, how much are you going to change it. Change it a little bit if you want, but it's the Q really that brings everything down.

MR. PARRY: Well, the --

CHAIRMAN APOSTOLAKIS: And it seems to me that's the way it should be done.

MR. PARRY: It depends what you're thinking you're doing, I think. It's --

MR. TRUE: Let me take a brief stab at defending what we did.

CHAIRMAN APOSTOLAKIS: I think you should. And I think that comes back to my request for a study that documents all these things.

MR. TRUE: Okay. I think that several things -- I think we can agree on several things.

Common-cause RAW is an extreme term. It's saying that all the components in that group fail 100 percent of the time for 100 percent of the year and --

DR. ROSEN: Now calculate CDF on that basis.

CHAIRMAN APOSTOLAKIS: Wait a minute.

MR. TRUE: And calculate CDF.

CHAIRMAN APOSTOLAKIS: Where does it say that? It doesn't say that.

MR. PARRY: Where does it say that?

CHAIRMAN APOSTOLAKIS: The way you calculate its importance says that, and that's what I'm objecting to.

MR. TRUE: No. It's the RAW term for common-cause event in a PRA --

CHAIRMAN APOSTOLAKIS: And that's what I'm saying.

MR. TRUE: You set it to one --

CHAIRMAN APOSTOLAKIS: You could never calculate the RAW of the common-cause event, that's my point. Because it doesn't make sense. It's not a basic event.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: We call it basic event, but isn't.

MR. PARRY: But it is a basic event.

MR. TRUE: So you agree with me, you're running -- you agree. You're agreeing that's --

CHAIRMAN APOSTOLAKIS: I -- what I'm saying is that --

MR. TRUE: You happen to agree with that.

CHAIRMAN APOSTOLAKIS: What I'm saying is that, yes, the codes do treat it as a separate basic event, but in fact it is a coupled event with the other things. And if you look at the multiple Greek letter method, for example, then it's obvious that Q is everywhere. And you are really calculating the RAW of A. So you're setting A equal to -- I mean, QA equal to one for failure of the unavailability going to one and then you should go to all the terms in the PRA that have that QA and set it equal to one.

MR. PARRY: That's an artifact of the way you calculate --

CHAIRMAN APOSTOLAKIS: A what?

MR. PARRY: That's an artifact of the way you're calculating the common-cause failure --

CHAIRMAN APOSTOLAKIS: But that's what you're doing. I mean, you can't do it this way here

and later on say no I'm not going to do that anymore.

MR. PARRY: You got to go back to what the definition of the events is. And the event -- the first event is the random failure of component A. The fourth event is the failure of component A in conjunction with other components. But it's still a failure mode of component A. That's the way those events are defined in NUREG 47 and its subsequent progeny. But it's an artifact of the way that we calculate the probabilities of those events that you calculate anyway to use lambda.

CHAIRMAN APOSTOLAKIS: I'm surprised you have to pay for the multiple Greek letter model.

And the other thing that really I think is upsetting right now is that we are doing this analysis here in real time, talking to each other, and the question is why hasn't the Office of Research investigated these things and settled them once and for all? Is it so difficult? Why? Would it take a million dollar study to do these things? No. Why do I have to come here and at 12:00 listen to Gareth tell me that it's an artifact and it doesn't matter, and this and that, and then Doug give something else?

I mean, if we are to have --

MR. PARRY: I didn't have the math,

George.

CHAIRMAN APOSTOLAKIS: I know you didn't, but I want to put words in your mouth.

If we -- I mean one of the goals of the agency is to have -- to build and maintain public confidence, right? I don't think we're doing that by doing things like that and arguing the last moment, yes, it makes sense, it doesn't make sense. It seems to me we should have a piece of work somewhere that documents that these things make sense, they are conservative or they're not conservative, and this, and this and that.

MR. PARRY: Well, actually, we do have a comment into NEI on this particular point. So that does --

CHAIRMAN APOSTOLAKIS: Well, this committee has issued reports that are more than 2 years old commenting on the problems with importance measures. I'm not sure anybody read them. The study should have been done already to settle the issue of importance measures and how you calculate them.

MR. CHEOK: George, there's no one from the Office of Research here, but I guess I'll speak for them a little bit.

They do have a limited study on importance

measures, and Louis Chu here from BNL is helping them do it.

And I think in terms of common-cause failures, I believe that the results show that there were four additional SSCs that would become important if you had included the RAW common-cause failure.

CHAIRMAN APOSTOLAKIS: So we should wait then until we see the study from Brookhaven before we say anything about this?

Are you addressing these questions, Dr. Chu? Come up here to the microphone.

DR. CHU: Okay. This is Louis Chu, Brookhaven Lab.

I think -- I work on some calculation using the Sequoyah SPAR model.

In terms of calculating the RAW considering the CCF, we -- I did I think exactly the way George described it. That is, in the SPAR model you calculate a common-cause failure probability in terms of the alpha factors times the Q value. So there's an expression for it.

And it happens that the SPAR model has the capability of, you know, you fail the component it will recalculate this common-cause failure probability. As a result, I believe this is the right

way, the accurate way of accounting for common-cause failure when you calculate a RAW value.

CHAIRMAN APOSTOLAKIS: So you're saying not to consider the term as a separate entity and calculate its RAW, but calculate the RAW of Q, which appears in two different places?

DR. CHU: Yes. We -- we --

CHAIRMAN APOSTOLAKIS: For the component? Even though Gareth says it's an artifact, which I agree. Because--

MR. PARRY: And, actually, we disagree with Louis -- at least I disagree with Louis' point of view, too.

CHAIRMAN APOSTOLAKIS: Well, thank you very much. I mean, that proves my point. We don't have a definitive study that tells us how these things--

MR. PARRY: I don't think the study is going to help you. But we know we can do it several ways, but you've got to get back to thinking what are you trying to do with evaluating the importance measure. And if you're trying to get the absolute importance of component A, then you have to look at all its failure modes. That's --

MR. TRUE: But it is only a portion of the

common-cause --

MR. PARRY: Well, yes, but it doesn't matter. If that common-cause fails A, it's a different failure mode of A.

MR. TRUE: Then -- then --

CHAIRMAN APOSTOLAKIS: But it does fail A.

MR. PARRY: Yes.

MR. TRUE: Then I think we need to reconsider the use of the criteria 2 for that kind of a failure mode. Because it's something that's totally different. We're taking a whole group of equipment and failing it and saying that exists for 100 percent of the year at least --

MR. PARRY: It's only different in degree, Doug.

MR. TRUE: -- for a component that's certainly out of service --

MR. PARRY: It's only different in degree. You're doing that with all the individual failure modes. So what's the difference there? That's also an extreme measure of the importance.

CHAIRMAN APOSTOLAKIS: Well, we cannot resolve --

MR. PARRY: No, no. Things don't happen for the whole year, which is what you're saying the

common-cause failure is.

CHAIRMAN APOSTOLAKIS: Obviously we cannot resolve that issue now.

MR. PARRY: Right.

CHAIRMAN APOSTOLAKIS: And I don't know how we can resolve it if you guys insist that nobody should look into it and document it someplace. But a study will not help me; I really don't understand that. I really don't.

I mean, I would like to see something that documents what Louis just said, what Gareth claims and so on and draw some conclusions. Why is this issue different from anything else that we study and say, you know, this is this way and this is not that way. I don't understand that we have to do it in real time here arguing that it doesn't mean this, and then Doug says we should reconsider the threshold. Well, gee, you know -- so I'm not sure we can reach a conclusion right now.

MR. PARRY: No, but I think you heard that from Mike and from Louis that there is a -- there is someone looking into this.

CHAIRMAN APOSTOLAKIS: Okay. So --

MR. PARRY: So I think at the end of that we will come up with some position.

DR. SHACK: And it makes a difference of 4 components?

CHAIRMAN APOSTOLAKIS: Yes.

MR. PARRY: In a particular example.

DR. KRESS: That hardly seems worth, does it?

DR. SHACK: Four 4 components?

DR. ROSEN: What do you mean by 4 components? Four components in the whole analysis or -- what does is this reference to 4 components?

MR. CHEOK: I think this is four additional components in one plant model.

MR. TRUE: But is there only two common-cause groups? Is that all that it brings in?

MR. CHEOK: I don't know the details.

CHAIRMAN APOSTOLAKIS: I don't know, guys. We are wasting our time now.

And the other thing is that I hope this study will not just say we did it for Sequoyah and this is what we found. I mean, there may be some logic behind all this and go back to the definitions; what does RAW mean, is it meaningful to really claim that when a component is down, everything goes down? You know, that kind of thing. It is not just that we provide is numerically for this plant and we got these

numbers. I mean, that's useful insight, too, but it seems to me the definitions here -- and I think that's where Gareth was going -- you know, what does it mean that I have a common-cause failure of 2 valves? Right? What does it mean that one valve fails as a subset? You know, that kind of argument would go a long way to convincing me, at least, that we know what we're doing.

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: Okay?

MR. TRUE: Okay.

CHAIRMAN APOSTOLAKIS: All right. Now, I don't have any more questions.

DR. ROSEN: Is it lunchtime or are we done?

CHAIRMAN APOSTOLAKIS: I don't have anymore questions or comments unless my colleagues around the table -- Peter? Steve?

DR. ROSEN: Are we going to hear the NRC staff?

CHAIRMAN APOSTOLAKIS: Well, the NRC spoke.

DR. SHACK: The ultimate pièce de resistance of all this is how we calculate delta CDF.

CHAIRMAN APOSTOLAKIS: The two to 5.

DR. SHACK: The 2 to 5.

CHAIRMAN APOSTOLAKIS: Yes, the 2 to 5.

DR. SHACK: You know, it's like question 15

MR. TRUE: Right. That's about the only--

CHAIRMAN APOSTOLAKIS: Let's discuss that one for a few minutes.

MR. TRUE: Okay. I guess the issue here--it's actually 14 and 15 are related to this.

It is true that South Texas, they do a calculation where the value's increased all the way to a factor of 10. They also did lower values. We don't know if they actually did 5, but I know they did 2 and some other intermediate value.

I think that the core of the issues here is that 10 is just as arbitrary as 5. Twenty is just as arbitrary as 10.

CHAIRMAN APOSTOLAKIS: But you didn't pick 20.

MR. TRUE: Right.

CHAIRMAN APOSTOLAKIS: Is that by chance.

MR. TRUE: We believe that the evidence that we have seen -- well, we haven't seen evidence that it will change by a factor of 10. That the evidence that was presented by South Texas in their

submittal actually said it probably isn't going to change a lot. And there is some --

CHAIRMAN APOSTOLAKIS: What is it that's changing? The mean value of the distribution?

MR. TRUE: The mean value. Yes. The mean.

CHAIRMAN APOSTOLAKIS: The mean value?

MR. TRUE: Yes.

CHAIRMAN APOSTOLAKIS: Not the --

MR. TRUE: I would say the point estimate value wasn't changing because they didn't -- I'm not sure they actually computed a mean. But the point estimate they compared didn't change significantly between the two groups. I don't remember whether they computed --

CHAIRMAN APOSTOLAKIS: Is that the Idaho study that --

MR. TRUE: No. This is --

MR. TRUE: We're talking in South Texas.

CHAIRMAN APOSTOLAKIS: Well, was --

MR. TRUE: Now, there are -- there are --

DR. KRESS: It was based on that.

CHAIRMAN APOSTOLAKIS: I thought that there was an Idaho study, wasn't it?

DR. KRESS: Yes, I think so.

CHAIRMAN APOSTOLAKIS: It was not a South

Texas study?

MR. TRUE: It was South Texas. There may be some work from Idaho, but I haven't seen that.

So we start off with a dearth of evidence. But the evidence that we have says it don't look like it changes a lot. Then there's a pretty big change.

DR. SHACK: Two to 5 is a small change.

MR. TRUE: Two to 5 is more reflective of what we've seen. And given that the evidence shows there's not a lot of change, we said well if there's not -- the evidence says there's not a lot of change, maybe we should just be operating within the same distribution and moving our value we're using from the mean out towards a more 95th percentile kind of value.

And, as you know, the nature of the lognormal distribution is that the mean doesn't get more than about a factor of 4 away from the 95th percentile. And, in fact, as the uncertainties get larger, once you get above about a range factor of about 20, the mean starts approaching the 95th percentile and can even pass the 95th percentile.

So the graph on the next slide between 14 and 15 shows the simple property of the lognormal distribution that the range factors we typically deal with on these kind of parameters are down in the low

310, 30 kind of a range. But the ratio of the 95th percentile to the mean in that range is below a factor of 5 and above a factor of 2.

So we said if we're going to do it and we don't have evidence that the mean does shift or the point estimate -- factors where it does shift, what we don't believe will happen. We believe individual ones may go up by a factor of 2 or 5 maybe at times. But we'll take them all at the same time and see what the delta risk is.

It's only a sensitivity study. And here's a point that Steve made earlier, it's not intended to say this is how bad it's going to get, this is where it's going to go. It's just to say that if this happened, as a sensitivity what would the implication be on changing the CDF.

And that's the basis for the 2 to 5.

DR. KRESS: Well, the fallacy in that argument is staying within the same --

CHAIRMAN APOSTOLAKIS: Yes.

DR. KRESS: There's nothing that I know of to say.

MR. PARRY: Well, everything's changing. It has to change some.

CHAIRMAN APOSTOLAKIS: It's a matter again

of going back and understanding what the distribution represents. Is a plant-to-plant variability that the reactor safety study talked about? And what if you're one of the plants that is on the tail already? Right? Or does it mean something else? You know, these are the kinds of things that I think we need a little more careful investigation.

Does the whole distribution change or not doesn't change, or --

MR. PARRY: I think also it's setting a dangerous precedent in some ways that that uncertainty distribution is purely a reflection of what we know about the parameters for the state of the plants as they exist at the moment. If we then start using that as an excuse for changing it; when we change the state of the plants, then I think that's -- it's intellectually dishonest, let's put it that way.

CHAIRMAN APOSTOLAKIS: And you say 2 to 5. Now the problem is what if I do it for 3 and it doesn't pass the criterion, then I go down to 2 and it does, then what do I do? You say --

MR. TRUE: Yes, I think in the end I believe we're going to end up picking an A number based on treatment. But we have yet to define what treatment we're going to do.

CHAIRMAN APOSTOLAKIS: Can you document that somewhere.

MR. TRUE: If a change in treatment is nominal, we think that the change in reliability would be nominal.

CHAIRMAN APOSTOLAKIS: Okay.

MR. TRUE: If it's more significant, then it might be more significant.

DR. ROSEN: Can I ask a few questions?

CHAIRMAN APOSTOLAKIS: Yes.

DR. ROSEN: I just wanted to clarify with Adrian that what you're going to do with this is come back with another draft of it? And that's going to take out all the treatment stuff as well as be responsive to what you know of the Commission's -- of the staff's intent with regard to 50.69?

MR. HEYMER: We will take a look at their comments, factor those in. We will take a look at the lessons learned we've documented from the pilots, and there's still one more pilot to go. And once we've done that, we'll take an attempt to redraft it. We'll meet with the task force to review it. And then we'll submit it as Rev. C.

DR. ROSEN: Could you answer my question about the treatment?

MR. HEYMER: The treatment -- the guideline based on some decisions that were made in January will focus just on treatment. Just on categorization.

DR. ROSEN: And all the treatments on it will be --

MR. HEYMER: The treatment it's our intent to call that out and put that into a specific industry guideline that will not be endorsed by the NRC.

DR. ROSEN: Okay. Thank you.

MR. HEYMER: And industry guide.

DR. ROSEN: Now I have another question, which is really goes to our agenda, which is that I came to hear what the NRC -- to hear what the industry said in response to our questions for sure, and you've done an credible job doing that. But I also came to hear what the staff thought of NEI 00-04.

Can somebody from the staff respond to that, Mr. Chairman?

MR. CHEOK: Can I real quickly mention about the 2 to 5 factor 2. The staff has asked I guess NEI to justify the fact that 2 to 5, NEI has submitted to us data from STP. The staff has not looked at this data yet and I guess we eventually may do that. But I guess treatment also gets factored

into this factor 2 to 5.

What happens if you pick a factor of 5 even? Does that mean when treatment is IST, does that mean you cannot increase the test intervals from 3 months to more than 15 months because the 5 bounds you to your lambda T by 2 factor? So we need to pull treatment into this discussion when we talk about factors of 2 to 5.

DR. ROSEN: Now you answered the question about this particular point. But I was more generally asking the question overall; what is the staff view about Rev. B of NEI 00-04? Do you have any comments on it beyond that?

MR. REED: Steve, I can say a few words.

DR. ROSEN: Yes, go ahead.

MR. REED: I'm just going to focus on one slide. It's going to reiterate a lot of what was said to start off the meeting that Adrian mentioned at the very beginning of the meeting.

It starts with a little bit of history, but I think it's important to keep remembering this. Because I think often times we lose the context and we lose the bigger picture.

We've been doing this since back in '99 when we came out with SECY 99.256 with ANPR. That's

what started this whole thing really rolling. And since then NEI has been developing the document. And we are now on the third round of comments that I believe you all have a copy of, which was sent to NEI several weeks ago. And those comments reflect both our review of draft Revision B as well as all the pilot activities that have been observed to date being collected.

The reason I think that we didn't hear a strong opinion a whole lot on these specific issues is the fact that we are largely in agreement. Now, you look at the comments and, of course, there's a pretty long list of comments. But to me, anyway, looking at the entire Option 2 picture and categorization, I don't think we're far off. We have some big issues in other areas, but in the categorization area I think all of these can be technically solved. I may be a little too optimistic here, so that's why I'm saying--

DR. ROSEN: What do you mean big issues in other areas? What other areas are there besides treatment?

MR. REED: Yes, exactly.

DR. ROSEN: Are you ready to talk to that? I thought you opted out of treatment?

MR. REED: Well, no, I'm talking about in

terms of in the rule. For example, I'll give you an issue of whether 50.55(a), a special treatment requirement, whether those requirements should be placed on RISC-3 SSCs or removed from RISC-3 SSCs. That's a very big issue.

In fact, we met yesterday with NEI and ASME on that particular issue to try to understand, you know, gather more information to help us make a decision on whether that should be one of the list of the special treatment requirements that should be -- you know, the requirements that should be removed from RISC-3.

As you know, South Texas was exempted from pieces of 55.55(a).

DR. ROSEN: Yes.

MR. REED: For Option 2 we've been considering in this particular instance all the way from 55.55(a) requirement staying on RISC-3 to the pieces being removed in a similar fashion to South Texas, or the entire regulation being removed from RISC-3. So, it's a very big issue. In fact, I think it's the biggest issue.

DR. ROSEN: I would really be puzzled if you deviated from what you did at South Texas. I mean, it seems to me it was agonizing in the staff

when we came to a conclusion. Why would you want to recognize that? You don't have to answer that.

MR. REED: Well, it's been very agonizing for us, I can certainly agree with you on that. And there are other issues.

I know this Committee and this meeting today was focusing on the concerns and issues on the categorization process, and so that's what we were focused on here today. And --

DR. ROSEN: But I would echo your comment about 50.55(a). I mean, 50.55. I am concerned that we are doing something -- that we would do something different and that -- and I said why earlier on, was that this is about scope. It's always been about scope; that which is within the special treatment requirements and that which is not. And so if you start using code cases, you're not really talking about scope anymore. You're really talking about iterating with the fine detail. And I think that's the essence of my trouble of going with an approach that relies on code cases rather than dealing with it directly in this building.

MR. REED: To continue then, as I think you probably gathered then from -- we were trying to meet on a few of the technical issues where I think it

was very clear that, you know, for example on CCF and RAW, that there were some disagreements. But, by in large, we weren't trying to do a lot because, in fact, we are I think in fairly good agreement on the categorization process and, you know, understanding that ACRS may have some concerns separate from that.

But, you know, I just pull out what I think we would consider the three biggest issues. And I think all these are solvable.

The issue of long term containment integrity and its consideration within defense-in-depth. The issue of the IDP guide, that's where I think where we agree with the ACRS. I think it's also been a feedback from the pilot activities. And I think NEI recognizes in fact that there needs to be a little bit more structure and guidance to the IDP.

DR. ROSEN: Can I stop you right there?

MR. REED: Sure.

DR. ROSEN: In my view what came out of the experience at South Texas was the absolute importance of the IDP. We really didn't anticipate that at first at South Texas. It wasn't clear to us when we started that that was how it was going to shake out. But it became clear very soon.

And so the things that were done to

select, to train and qualify the members of the expert panel, the IDP, and its working group became very important. And the structure that they worked in because it was going to be so difficult, we could see. The answers were not just going to come out of the end of a computer.

The issues of structure and scrutability became even more important. Documentation, clarity. Even continuity of membership of the members; didn't want to have people scuffling in and out of the thing. And that the guideline is absolutely almost silent on those issues, which to me turn out to be some of the important issues, the soft issues, if I may call them those.

So, I would encourage both the staff and NEI to pay more attention to what we found to be some of the more important dimensions of this process.

MR. REED: I think all the parties agree that there needs to be some work done there, and it's already been mentioned this is a interim product. And so we'll see how it evolves to the next Rev. I think it will.

And, of course, the last item there, this is a big issue, it's a lot of what was talked about today. In fact, Mr. Burchill talked quite a bit about

PRA quality. But that's a very important aspect of, you know, is your PRA is a sufficient quality really to support this categorization process? And, you know, staff has -- work has been underway for quite some time reviewing the peer certification process. And we recognize that that's something that will have been done. Now the question is what's necessary for licensees to implement Option 2, what do they need to provide to the staff as a submittal for us to take a look at so we can conclude that, yes, what you've got there in place is good enough to implement this to Option 2.

And it just really turns into a review guidance for the staff in reviewing a submittal to support this. And we actively are working on that, you know, right now.

So, you know, a very quick overview. What I'm really trying to point out is we're pretty far down the road here. We're on the third round of comments. We're not too far off in categorization. We have some big issues. From the staff's perspective I think we can solve. We're hearing, you know, some issues of course from the Committee.

In fact, George, I think we would like if possible to get a letter from the Committee. I think

it would help us do our job better. Because we need if possible to get these concerns documented to help us when we get to the proposed rule stage to help address this when we bring the proposed rule to the Committee.

So, if possible, I think we would appreciate a letter. I understand there's a lot of views bouncing around, that's going to be a difficult thing for you to do. But --

DR. ROSEN: If we agreed to that, you'd get a letter on Rev. B of NEI 00-04. You need a process letter? Because we know they're going to change it?

MR. REED: Yes, but it helps us -- some of these concerns are pretty broad based and I think it would help us, I believe, to try to have them addressed as we go forward. That's -- in other words, to be better prepared and hopefully get the proposed rule package to this Committee. That's my thinking going forward. But, you know, again, what we were focused on was the issues and concerns from the letter from the ACRS, and we were charming in as we went along. And that was the main focus. This is really to give you a view of where we stand.

And, of course, you have our letters, our

specific comments on NEI 00-04.

CHAIRMAN APOSTOLAKIS: Any other comments from the members?

DR. ROSEN: Well, I have one more, George.

CHAIRMAN APOSTOLAKIS: Yes. Go ahead.

DR. ROSEN: On this last point, the relationship of NEI 00-02. It was my understanding that that relationship was nil, and that is -- and let me give you my version of it and I will stand corrected if you can help me, or if Adrian can help.

00-02 describes the PRA certification process. It is part of -- it is referenced in the ASME standard. The standard stands tightly linked with the PRA certification process. And 00-04 invokes the standard, which it hence evokes 00-02. Those are not separable things. We insist on good quality PRAs to support this process would be required. And, therefore, need to meet the standard, the ASME standard which -- or if you prefer a shorthand, you need to meet 00-02 but I think it's a more complete thing and it's certainly scrutable to the public, which may or may not have access to 00-02, to say that you need to meet the ASME standard which incorporate the certification process which is explained in 00-02, although it stood alone before that. I mean, it was

part of another process.

So, I don't think -- to me the relationship is not unknown. I'd be interested in your views.

MR. PARRY: Yes, I think the relationship is not unknown in general, but I think the question is what can the staff make out of what the reports say about -- what submittal that come in using NEI 00-04 said concerning the definition of quality, if you like, that came out of NEI 00-02. And I think the staff has some concerns about that, largely because what we have to do as the staff, I think, is to be convinced that the risk input to the IDP is adequately supported by the licensee's PRA. Okay.

Now, for us to do that I think we have to understand precisely what has gone into NEI 00-02 and how the grading process has gone on. And there are some things that I think that we feel a little nervous about.

For example, and our understanding is that NEI 00-02 requires the documentation of facts and observations when a grade 3 is not awarded to a particular element. I may have this slightly wrong, but that's at least what we read into it. But there are equally important issues that are related to the

assumptions that the analysts have made. I'm going to give you a good example, like the HRA method, for example. Human reliability analysis method. They may meet the criteria that are in the ASME standard and the other requirements, I should say, and in NEI 00-02, but those are flexible enough that they would allow a licensee to use any one of a number of different methods which could give you very different estimates of human error probabilities.

To some extent that worries us less in Option 2 on that particular issue because one of the requirements is for the licensee to do sensitivity studies on human error probability values, for example, which would make us feel more comfortable that they haven't obscured SSCs because of using very conservative HEPs or they haven't pushed some SSCs to be unimportant because of using very optimistic HEPs.

But nevertheless, there are issues like that that we're sorting through that I think that we have to have more confidence about to accept the results of a categorization using NEI 00-04 coupled with NEI 00-02. And that's the guidance that Tim talked about that we're putting forward as to which of these areas do we need to look at.

And just to give you one of the reasons I

think why this occurs, is that the sub-tier criteria on which the grading is performed in NEI 00-02 we don't feel that they clearly define what goes into the grades, and in particular what goes into grade 3. So knowing something that has grade 3 doesn't tell us what was done.

CHAIRMAN APOSTOLAKIS: Adrian?

MR. HEYMER: Yes. You had a number of questions on the certification process, and we didn't really get to those today. We covered the PRA quality ones in some depth. And I think before we can sort of look to some response from this Subcommittee or the full committee, is I think we need to explain where we are with regards to certification process and Option 2, and respond to some of those questions.

If we want to start discussing those now, we'll introduce --

CHAIRMAN APOSTOLAKIS: Well, that brings up another issue. We will have a presentation at the full Committee meeting, right? An hour and a half? Are you planning to come, NEI?

MR. HEYMER: We're planning to be there, yes.

CHAIRMAN APOSTOLAKIS: Well, maybe, you know you can focus on major issues and not take every

question that we have asked in detail and address them then.

MR. HEYMER: We can focus on the major issues, but I think we also need to emphasize that this document will change. You'll probably see, I wouldn't say substantial changes, but there will be changes in certain areas like the IDP guidance, and there were some specific reasons why we went down that approach.

CHAIRMAN APOSTOLAKIS: Yes.

MR. HEYMER: And what I understand the staff needs some help in input is regards to drafting the notice of proposed rulemaking, it is a notice of proposed rulemaking. It is not the final rule.

CHAIRMAN APOSTOLAKIS: Yes.

MR. HEYMER: And we still have a long way to go. There are some substantial issues on the table not associated with categorization.

DR. ROSEN: I would only comment, now that I've listened to the staff and Adrian, NEI, that I'm a little bit uncomfortable with the idea, mainly from what you said, Gareth, that the staff is worried about or is uncomfortable with some tier guidance in the NEI 00-02 in the certification process.

It seems to me that that process is now

embedded in the standard and the proper place to have voiced those concerns and had them addressed was in the consensus process. And to now be worried about that at this stage smacks a little bit of wanting to change the outcome of the consensus process. I may be wrong about all that, but think about that comment in the light of what you said.

MR. PARRY: Yes, I'd like to respond to that. I don't think that the fundamental process of a peer review is reflected both in the standard. And, obviously, the peer process is NEI 00-02. However, NEI 00-02 has not been changed to reflect the consensus process that was done in the standards. So that is a different issue.

And I think it's actually no secret that we have been concerned about the sub-tier criterion in NEI 00-02. We've made this point over the last 3 or 4 years. So I think this is nothing new. This is just a continuing situation. But I think that, you know, the standards is something -- is another animal and that's in terms of the requirements. They're clearer, I think, than the sub-tier criteria of NEI 00-02.

DR. ROSEN: So what you're saying is that NEI needs to conform 00-02 to the standard?

MR. CHEOK: Actually, I think both NEI and the staff recognize that there are some differences between 00-02 and the standard. And as a result of that, I think NEI has asked the staff to look at 00-02 with respect to Option 2. And I guess to provide comments as to the adequacy of 00-0s with respect to Option 2.

DR. ROSEN: Well, it doesn't make any sense to me to have another set of how you do things different from the standard. I think both NEI and the staff understand that it'll have to come together on the issue of peer certification ultimately.

CHAIRMAN APOSTOLAKIS: Okay.

MR. BURCHILL: Can I make a comment?

CHAIRMAN APOSTOLAKIS: Yes, sure.

MR. BURCHILL: I want to just clarify something that Gareth said, and then I also wanted to make a comment on the relationship between the standard and 00-02.

In the NEI 00-04 there is an outline of the submittal an applicant would make relative to this categorization process. And in it it's stated that the applicant should have a high level summary of the results of the peer review including any PRA elements that are graded below 3 in the standard elsewhere --

or the guideline rather elsewhere says that it's expected that a grade 3 is the nominal grade measure of capability of the PRA for this application. But it also says that the disposition of all peer review fact and observations classified as A or B would be reported.

And there's a clear distinction between the grading scheme under the peer review process and the fact and observation sheets which their level of significance relative to the capability of the PRA is measured in this A, B, C category. And everything in the A/B category, whether it is associated with an element that was graded, you know, 1, 2, 3 or 4, it doesn't matter. All of those are to be reported and how they were dispositioned.

So, I just wanted to clarify that there's two different dimensions to how that's actually done. And that's required by the guideline to be included.

Relative to the ASME standard and the peer review process, I think it is -- help me on this. I think it's section 6 of the standard that refers to the peer review process. I think --

MR. PARRY: Yes, I think that's right.

MR. BURCHILL: Yes. I think section 6 refers to the peer review process. And at least in

the last draft that I've seen, I think which is 14(b) I believe, it's very clear that there's a very tight linkage between the standard and the peer review process. And, in fact, having just gone through it myself personally in order to look to adapt that element of the standard to the one that we're working on for low power and shutdown in ANS, you know, what I found is that it very tightly ties the peer review process into determination of compliance with the standard.

And, in fact, the owners groups jointly have underway with the BWR owners group in the lead presently, a very detailed comparison between the sub-element criteria in the peer review process and what the standard calls out. And I think by the time that we're in a position to apply this under Option 2 that will have become in widespread use in the industry for demonstrating through the peer review process how the PRA compares to the standard.

MR. PARRY: Can I just add to that?

MR. BURCHILL: Yes.

MR. PARRY: I think where the comparison has to be made, Bill, if that would be compatible is at the sub-tier criteria level.

MR. BURCHILL: Right.

MR. PARRY: And at the supporting level requirements of the standard. When that comparison is made, then I think they will be more --

MR. BURCHILL: That is what we're doing.

MR. PARRY: Okay. Good.

DR. ROSEN: Good. That's very helpful. And I think that that linkage between those things is what was intended when we set out on this process.

CHAIRMAN APOSTOLAKIS: Okay. So is it clear now what the presentation at the full Committee meeting is going to be? The presentation will be by you or you and NEI, or just NEI?

MR. HEYMER: Well, I think there's been some confusion over the full Committee meeting, George. What actual date is that?

CHAIRMAN APOSTOLAKIS: March --

MR. MARKLEY: Let me get the agenda real quickly. Yes.

MR. PARRY: The 7th, I think.

MR. MARKLEY: I think the 7th, but I can't tell you the time off the top of my head.

CHAIRMAN APOSTOLAKIS: It's March the 7th at 10:15 in the morning.

MR. HEYMER: We need to caucus amongst ourselves to make sure that we can get the right

people here for that.

CHAIRMAN APOSTOLAKIS: Okay. So it's primarily the staff then if they come.

MR. REED: And to make sure I understand, this is going to focus on NEI 00-04 and the staff's issues with 00-04 now?

CHAIRMAN APOSTOLAKIS: Well, it says proposed NEI 00-04.

MR. REED: Okay. In other words, not focusing on ACRS questions and concerns about on what our issues are?

CHAIRMAN APOSTOLAKIS: The whole report, yes.

MR. REED: Okay.

CHAIRMAN APOSTOLAKIS: Okay. I take it there are no more comments from my colleagues or questions?

Well, I thank the gentlemen from the industry for taking the time to come and talk to the Subcommittee, and staff members.

DR. ROSEN: Before we adjourn --

CHAIRMAN APOSTOLAKIS: Yes?

DR. ROSEN: We should discuss amongst ourselves, not that it's secret but just with the ACRS, the desire to write a report at this stage. I

think the staff has asked for that.

CHAIRMAN APOSTOLAKIS: Yes, the staff has asked for a letter, yes.

DR. ROSEN: A letter. And the question I have is --

CHAIRMAN APOSTOLAKIS: Well, let's go around the table and see how people feel about it. Who wants to start? Peter?

DR. FORD: I've still got a concern about a time dependent --

CHAIRMAN APOSTOLAKIS: No, but should we write a letter?

DR. FORD: My consideration is no.

CHAIRMAN APOSTOLAKIS: No.

DR. ROSEN: My consideration is no also, because I think it's a work in progress. There are so many questions that I have about this that I would like to see the final draft. I think if we wrote a Larkins Graham that said something like we think there hadn't been the right direction, we're glad to see that the staff and NEI at least from the staff's point of view we believe have general agreement, that it's likely to be a success path; that's fine. But I don't think we're ready to write a letter to the Commission on it.

CHAIRMAN APOSTOLAKIS: Bill?

DR. SHACK: I sort of agree that we shouldn't write a work in progress. You know, if we're going to have fundamental problems with things like using fixed values for Fussell-Vesely, you know, and the staff seems to be heading down that road, then you know, maybe we do need to write a letter if there's a consensus that that sort of detail is a show stopper. I just don't know.

I think we'll need some discussion among ourselves to kind of -- you know, if we looked at the staff questions on 00-04 and we've looked at our questions on 00-04 -- you know, suppose they did resolve all their concerns? Would that resolve all our concerns? I don't think all of Mario's concerns will be addressed. But then, I'm not -- you know, he's standing in front of a train here.

CHAIRMAN APOSTOLAKIS: Now when you say we discuss, today or at the full Committee?

DR. SHACK: Somehow in an informal caucus. You know, as to whether -- what issues are still open for us.

CHAIRMAN APOSTOLAKIS: With all the members?

DR. SHACK: I think with all the members.

You know, it seems to me, for example, a lot of my concerns with the IDP sound as though, you know, that's in such a state of flux.

CHAIRMAN APOSTOLAKIS: It is in a state of flux.

DR. SHACK: That, you know, I don't see there's any point in saying anything about that. You know, the treatment of uncertainties and the use of fixed Fussell-Vesely values, you know, that I'm not sure is going to be addressed in any changes that I sort of foresee coming from -- and, you know, if we feel that's a show stopper, then --

CHAIRMAN APOSTOLAKIS: Okay.

DR. SHACK: -- we should fire off on that. But, you know, my inclination is that my big questions were on the IDP, and that seems to be in such a state of flux that I don't see any real point in writing a letter at this moment.

CHAIRMAN APOSTOLAKIS: Dana?

MR. PARRY: It seems that you pointed out a variety of areas where you thought there needed to be some developmental refinement of the technical foundations of the methods. And it seems to me that it would be useful to document those needs within a letter that says basically this process is going on

pretty well. And that what the staff and NEI are doing is a pretty good thing. That the technical foundations may need to be shored up and in these areas we think that it would be useful to shore them up and lay them out and whatnot, so that they're in front of people and people can act on them.

CHAIRMAN APOSTOLAKIS: So the way I understand what Dana proposed is, you know, write something that recognizes that things are in a state of flex and a lot of the concerns we raised are being addressed. But here are 1, 2, 3, 4, however many there are issues where we feel we have to express our views now for the benefit of both NEI and the staff as they work on this revision? I think that's what you said?

MR. PARRY: Yes.

CHAIRMAN APOSTOLAKIS: There are certain things we feel we should document at this stage. And we don't have to, you know, be exhaustive and say well we have a worry about the IDP, but that's being addressed.

DR. ROSEN: Well, I think that's the point that I would -- I mean, I could agree with Dana's suggestion, except that I wouldn't want a letter that we wrote now to be viewed by anybody as being

inclusive or exhaustive.

CHAIRMAN APOSTOLAKIS: No.

DR. ROSEN: Because there's lots of things that we talked about.

CHAIRMAN APOSTOLAKIS: And we can say that, yes.

DR. ROSEN: Including the IDP, etcetera that we -- there's no point going into a detailed discussion of it at this point until we see what they come back with.

MR. PARRY: I wouldn't want it to be viewed as exhaustive. Similarly, I wouldn't want people to look at the areas where technical foundations need to be shored up to say -- and you can't do anything without shoring these. I didn't hear anything that was so fundamental that -- in the area of technical foundations that without its resolution we were hamstrung. I saw it a matter of persuasion, a matter of convincing that the approximate solutions were correct. I didn't see it -- I didn't hear any of them that said and this is likely to be a fatal flaw in these approaches.

CHAIRMAN APOSTOLAKIS: That's true. I guess an element that at least I tried to bring up here is the element of rigor and public confidence.

Okay. And a lot of the responses have been, yes, but this doesn't matter or, you know, this is okay. We tried it in one place and it worked. And I want to see a little bit more there. And I believe there is a disagreement or at least an initial disagreement or not willingness to go along by both the staff and the industry. And that's something that I would like to document.

MR. PARRY: Well, there is an element of public confidence that's going to have be confronted sooner or later, and it's the question of if you are a heart surgeon, do you want a grade C student. I mean, if you're a heart patient do you want a grade C student doing the heart surgery on you? And, you know, it is --

DR. ROSEN: I think the analogy is not entirely apt.

CHAIRMAN APOSTOLAKIS: I wouldn't want to challenge the analogy right now. But you were in the middle of something.

Okay. I would suggest --

MR. PARRY: I don't want to stand in front of a freight train.

CHAIRMAN APOSTOLAKIS: I would suggest that Dr. Kress has agreed to send me an email -- I'm

sure he will send it to everyone here -- with his views as to what should be in the letter. I think he's working under the assumption that there will be a letter, but you know, we can always talk to him. And I would urge you to do the same. In fact, it is Steve and I who are working on this. So if you can send both of us some points that are along the lines of what we just said; that it will not be an all inclusive letter. It will not address everything. It will acknowledge up front that this is work in progress, but here are a few things that we feel we ought to document at this stage knowing full well that the staff and the industry are still working on this document.

So, please send those to us. And then Steve and I will think about drafting something, perhaps.

DR. ROSEN: To bring to the full Committee?

CHAIRMAN APOSTOLAKIS: Of course, to bring to the full Committee. Okay?

And, again, I thank everyone for coming here and spending time with us.

And this meeting of the Subcommittee is adjourned.

(Whereupon, at 12:52 p.m. the Subcommittee was adjourned.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: ACRS Reliability and Probabalistic Risk Assessment Subcommittee

Docket Number: (Not Applicable)

Location: Rockville, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Pippa Antonio

Pippa Antonio
Official Reporter
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