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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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RELIABILITY AND PROBABILISTIC RISK ASSESSMENT (PRA)

SUBCOMMITTEE

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CLOSED SESSION

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MONDAY, SEPTEMBER 15, 2014

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 1:00 p.m., John W. Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

DENNIS C. BLEY, Member

RONALD G. BALLINGER, Member

JOY REMPE, Member

STEPHEN P. SCHULTZ, Member

DESIGNATED FEDERAL OFFICIAL:

HOSSEIN NOURBAKHSH

STAFF PRESENT:

MARY DROUIN

DONNIE HARRISON

HANH PHAN

LYNN MROWCA

T-A-B-L-E O-F C-O-N-T-E-N-T-S

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

1:01 p.m.

CHAIRMAN STETKAR: This meeting will now come to order. This is a meeting of the Reliability and PRA Subcommittee. I'm John Stetkar, Chairman of the Subcommittee meeting.

ACRS members in attendance are Dennis Bley, Ron Ballinger, Steve Schultz and Joy Rempe. Hossein Nourbakhsh of the ACRS staff is the designated federal official for this meeting.

The staff will brief the Subcommittee members on the Interim Staff Guidance for assessing the technical adequacy of the probabilistic risk assessment for advanced light water reactors.

This meeting is closed to the public due to the discussion of pre-decisional version of the ISG, Interim Staff Guidance. The Subcommittee will gather information, analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the Full Committee.

We will now proceed with the meeting, and I'll ask, Lynn Mrowca, I guess if you have any

statements?

MS. MROWCA: Hi, I'm Lynn Mrowca, and from the NRO PRA and Severe Accidents branch chief.

I just wanted to give you a little bit of why we developed Interim Staff Guidance before we launch into all the details. I think when we were reviewing the current new reactors and we saw that, for instance, on PRA technical adequacy the current standard that everyone was using, everyone made their own assessment of whether or not they could meet the supporting requirements. And so we thought this is something that would be perfect for a standard. However, in the absence of having a standard issued, we thought it might be expeditious for future applicants to see what the NRC expected, and hence the formation of this Interim Staff Guidance.

In the meantime, there's a parallel effort ongoing with industry to develop an advanced light water reactor standard. And I think maybe the focus really is on pre-operational phases like licensing under Part 52 where there are specific things that you can't meet in the standard.

So here we are on the verge of issuing the ISG. It is publicly available in draft form

right now. We're still awaiting the issuance of an FRN to start the public comment period.

CHAIRMAN STETKAR: Let me ask you, Lynn, since you brought it up, and I don't have any familiarity with this document because I haven't had a chance to look through it, but in December of last year, 2013, ASME and ANS released a standard, RAS 1.4-2013, probabilistic risk assessment for advanced non-LWR nuclear power plants for trial use in pilot applications. As I said, I've not read through that, period. But it strikes me that we're developing very pigeon-holed standards for a variety of things that sound awfully similar. For example, I don't know why there would be a fundamental distinction between PRA quality requirements for a non-LWR that we don't have versus an LWR that we don't have.

So my question is has the staff looked at that standard?

MS. MROWCA: I think Mary Drouin would like to answer that question.

CHAIRMAN STETKAR: And how does it mesh with the to-be-issued standard for non-existent LWRs?

MS. DROUIN: There is a lot of history

with that standard. The NRC was not always totally in support of that standard for some of the reasons you just mentioned, but like in any organization there are politics involved and there were a lot of political decisions of why that standard was developed.

The NRC view was that right now it has a little to no priority. Our work on doing anything with non-LWRs, there's not an applicant in sight. So we told ASME and ANS that from a regulatory perspective we didn't see the need for this standard. But ASME and ANS, they can develop whatever standards they so choose. They don't have to do what we think is the right thing or the wrong; and right or wrong is really not the right words to use here, but we have never been in support of development of that standard, and we have repeatedly told them that we have no plans to review and endorse it.

Our resources, which are very limited, are going to be focused on the standard that's out there for operating reactors and trying to get all the different hazards there covered from a level 1 for internal events, flood, fire, seismic, a level 2; that was more than enough work, and to look at

what you would need for a light water reactor in the design cert stage.

I'm hesitant to say stuff here in a certain way. I'm trying to -- because I don't want to impugn ASME and ANS on some of their decisions that were made that the NRC wasn't exactly supportive of. MEMBER SCHULTZ: Perhaps I can ask a follow-on question that might at least clarify it for today's discussion. I haven't read it either, or looked at it. If we did, is it developed? Is that standard developed in such a fashion as is being done here; that is, taking the current approach and augmenting or amending it so that it's applicable to a different set of advanced reactors or is it a brand new approach it's taken?

MS. DROUIN: It does have new stuff in it in that it is written as a single continuous standard in the sense that there's no demarcation in that standard between the level 1 and level 2, and a level 2 and a level 3. So it takes you from your initiator all the way out to your fatalities. But to review a standard; at least in the way we have to review it at the NRC, is not a trivial effort. It's a lot of resources to review a standard. And this is a 500-some-page standard,

and that would take a lot of time and, as I said, a lot, a lot of resources that until this is a priority, non-LWRs -- and I focus on saying non-LWRs because one of the things that the NRC -- we don't want to have are two standards covering the same technical area. That just --

CHAIRMAN STETKAR: Well, but you're looking at having three now.

MS. DROUIN: No, where is the third one?

CHAIRMAN STETKAR: You're looking at having the standard for operating plants, you're having the standard for LWR in non-operating plants and the standard for non-LWR, non-operating plants.

MS. DROUIN: Well, no. No, no. This one here that's coming out is for the design cert stage. It's not --

(Simultaneous speaking)

CHAIRMAN STETKAR: Well, I'm characterizing is LWRs non-operating.

MR. HARRISON: Yes, before operations.

MS. DROUIN: Right.

CHAIRMAN STETKAR: I count three standards.

MS. DROUIN: Okay. The LWR for design

cert is part of the LWR standard. It's not going to be a stand-alone standard.

MR. HARRISON: It would be an Appendix A if they made it into a standard.

MS. DROUIN: It's an appendix.

CHAIRMAN STETKAR: Okay.

MS. DROUIN: So it is closely developed with the operating standard.

CHAIRMAN STETKAR: So the plan would be to -- the next release of the document that we have on the screen here would have an appendix that covers design cert?

MS. DROUIN: Yes, it is going to be part of the light water reactor standard.

MR. HARRISON: And we'll discuss a little bit about that.

MS. DROUIN: Yes.

MR. HARRISON: Because that's still spinning right now in that we can talk about why the driver is for us doing this now as opposed to where they're going. It gets into the kind of why we're doing this.

CHAIRMAN STETKAR: I didn't want to make this too political because there's a lot of technical things, I mean. But it just struck me

that we seem to be duplicating the efforts here.

MEMBER SCHULTZ: And that's what I was asking is there something that is of technical value that could be --

(Simultaneous speaking)

CHAIRMAN STETKAR: I mean, when I say we, not necessarily the agency, but the entire assembled wisdom.

MR. HARRISON: If I can jump ahead, about two or three years ago the ISG was being developed, as well as the PRA standards community was working on Appendix A, which was just to address the ALWR's design cert COL, the pre-operational phase. About a year ago Lynn's group and myself, we started to look at their product. And we went to a meeting a year ago September and said the direction they were going with their write-up had a number of concerns for us. That accelerated us to move onto the Interim Staff Guidance to write this to get it out quickly, because we basically kind of stopped them and said we're going to have problems endorsing your appendix. And we can get into more of why that was.

Just as an example, one of the comments

they had was they were creating alternative requirements. So you couldn't meet a requirement. But they said, well, we'll write an alternative that says do this instead. Sometimes that's appropriate. CHAIRMAN STETKAR: You've done that.

MR. HARRISON: I've done that, yes. Sometimes it's not appropriate. And unfortunately they would then -- that led you down a path. If I give you an ultimate requirement to a Capability Category II, and then you go and say I want to do an application, they're going to say they meet capability 2, so the alternate requirement. And they actually didn't meet the requirement. So it created in my mind confusion and chaos potentially going down the road. So that's just one example.

MEMBER BLEY: Let me ask a separate question just so I understand how things will progress, because I haven't been following closer. In the earlier standards NRC was a participant in their development, although officially 1200 came out and evaluated and said what you're going to do. Is NRC participating in the development of this standard and in the development of the non-light water reactor standard?

MR. HARRISON: We're actively on this standard and we have a representative on the non-LWR.

MEMBER BLEY: Okay. So at least you're following what they're doing?

MR. HARRISON: Right.

MS. DROUIN: Right. From the early days when we first started there was just that one group. Jaycee Mariam (phonetic) has grown in the areas, there=s at least a dozen different writing groups, and we do have an NRC person for each group to pay attention of what's happening.

MEMBER BLEY: Can I take you back to John's original question and not dive into the politics? From what you've seen out of that development for the non-LWR is there anything unique about PRA for non-LWR that is -- not that you're working on it now, but that would require a different standard from your point of view? I understand you haven't worked work on that.

MS. DROUIN: In the level 2 part --

MEMBER BLEY: Yes.

MS. DROUIN: -- because you are getting into different core, different materials, so that part could be substantially different, your

containment. It's really probably more so the level 2.

MEMBER BLEY: And that could vary from design to design.

MS. DROUIN: Yes.

MEMBER BLEY: Not just non-LWR, yes.

MS. DROUIN: That is accurate.

MEMBER BLEY: Okay. That's enough from me.

MR. HARRISON: A similar question was asked of the Advanced Light Water Reactor Working Group.

MEMBER BLEY: Yes.

MR. HARRISON: Is there anything unique about advanced light water reactors that makes the standard not work?

MEMBER BLEY: Yes.

MR. HARRISON: And the answer was no. We found nits, if you will, where you could add a supporting requirement in the systems thing on digital I&C, or you could just put it in the list of examples. There were little things like that were unique things in the advanced designs, the passive features. It would be nice if you added that phrase when you talk about system modeling to

say "include passive systems." But there was nothing fundamentally wrong with the current standard that needed to be fixed to address advanced light water reactors.

MS. MROWCA: The non-light water reactor standard, actually the authors believe that it's technology-neutral. And I think because, as Mary said, there might be confusion in the PRA standards world that if you have a technology-neutral standard and then you have the current standard, what do you follow? So they decided to keep that name, non-light water reactor standard. And I will say that it is being used, referenced in code cases that are being developed right now. So we're following all of that very carefully and what our future applicants may use so that we can be prepared for our reviews.

So I just wanted to say in summary about the documents, I hope this discussion has helped, that we have the non-light water reactor standard that's been issued, but not NRC endorsed. We have the current PRA standard of which there is an advanced light water reactor standard that will be a mandatory appendix addressing pre-operational phases. And then what this Interim Staff Guidance

does, since that standard for pre-operational phases is not out yet, this Interim Staff Guidance is being written to help our applicants understand what the NRC expects when it comes to Part 52 licensing especially.

CHAIRMAN STETKAR: Thanks.

MR. HARRISON: A good intro to the presentation?

Okay. I'll go ahead and start then. And I want to start by apologizing. If you try to read that ISG without having the standard open next to you, it's a very difficult task, if not impossible. So we'll see how well I do with a split screen here of having the standard over on one side and having the presentation here in the middle. It looks like I can do one with each hand as we go.

I've set this up into four basic sections. The first section is just to give a purpose scope background, an outline of why we wrote the ISG and its scope. And then I have a topic called "General Topic," general interpretations of the current PRA standard for the design cert and for the combined license applicants. So those are just general

interpretative challenges that you can make to use the current standard and make it work for a pre-operational plant.

Then the next two sections as part of the general topics is the last bullet, which is technical challenges, but I've split it off because it's got some specific changes where we're saying you can't meet certain things or you need to replace a requirement with something else. And these last two topics I have examples.

So the SR evaluation process I walk through kind of the process of how we evaluate each of the current standards' requirements and then determined if you could meet, could not meet it, and what those meant, if there was additional clarification needed. And I've got a number of examples for each of those categories, as well as for the technical challenges where we grouped those things together and said they align in the different types of groups of what you can't do or what you need to replace.

So with that, we will move forward to the purpose. Again, Lynn mentioned it provides the NRC's kind of position so that you can have a consistent consideration of the PRA standard for

assessing the technical adequacy of the PRA that's used for the application, the Part 52 design certification application or the combined license application. It's considered as a supplement to Reg Guide 1.200 which endorses the current standard, which is currently Addendum A of the ASME/ANS PRA standard. There is an Addendum B, but we didn't endorse that part of the standard because that was essentially a clean-up of Addendum A. There was not a significant technical change from Addendum A to Addendum B.

We expect that we'll incorporate this guidance into the next version of Reg Guide 1.200 or Reg Guide 1.206, which is the COL guidance, and SRP 19.0, which is the new reactors.

MEMBER BLEY: Why would you put it in 1.206? 1.206 is programmatic stuff mostly, isn't it?

MR. HARRISON: Within 206 there's some guidance on the actual application. And so, I've got the "as appropriate." If there's anything in here like the definition of --

MEMBER BLEY: Oh.

MR. HARRISON: -- large release frequency versus large early release frequency,

things like that might need to be put into a different section. The majority of this I would guess would be an appendix to Reg Guide 1.200 and then we flagged it in SRP 19.0 for the staff.

MEMBER BLEY: But this is on some kind of schedule to be done in a couple years, not --

(Simultaneous speaking)

MR. HARRISON: Yes, and we expect it to be done after the next addition of the PRA standard. That's expected in the fall of 2016. So give a year after that, fall of 2017. If they stay on their schedule for issuing a new addition to the standard, then this would be incorporated about a year after that.

MEMBER BLEY: Yes. So it's a number of years away.

MR. HARRISON: And as we were discussing beforehand, there's a similar but broader scope effort being developed by the ASME/ANS PRA Standards Working Group Project Team. It's broader in the sense of they may actually be looking at establishing the state of practice as opposed to a regulatory perspective that says here's what we need at a minimum for you to provide. They actually may be looking at what you

should do to create a consistent approach to developing a PRA at some level. So they're going to essentially try to establish what is the state of practice or the state of art for a PRA in the per-operational phase for a design cert or whatever?

They also may be addressing Capability Category II. You're going to hear me say that we're addressing only Capability Category I as the starting point as the starting point. They may actually go through fuel load, and it's still undecided if they'll actually address early operations before you have data and experience. So the first cycle or two you're not going to have operating experience to be able to plug into your PRA.

So we've designated that our transition from this ISG to using the PRA standard should occur by fuel load. That kind of becomes a nice switchover, recognizing that you still don't have data and operating experience. But that's the only requirements you won't be able to -- going forward. The Standards Project Team is still debating I think where that transition point is.

So the scope of this ISG. It's for the

PRA that's required by the regulations for the design cert application and for the COL application. Those are the references for that. It is not for a PRA that is required for the licensee, what's referred to in the regulations as the COL holder. In 10 CFR 50.71(h) it talks about needing a PRA by the time of fuel load. It's a level 1/level 2 PRA. And then you update that as you go forward into operations.

MEMBER BLEY: Let me ask you just a -- I think we talked about this sometime in the past, but I lose the thread once in awhile. This is for Part 52 applications. Mike Mayfield is working on design-specific review standards for SMRs. Do these things fit together somehow?

MR. HARRISON: Lynn, do you want to talk about what they're doing there?

MS. MROWCA: Not exactly. Not for PRA, because PRA is more generic. And so we just updated SRP 19.0 to address lessons learned and things that we needed to clarify a little bit more. The design-specific review standards -- there were two reasons to update those. So you take a system that's currently in the SRP. You write a design-specific review standard to one. Take care of

technology differences. So if there's a difference in the way a cooling system works --

MEMBER BLEY: Yes, but for example, their chapter 7 took advantage of all that's been learned in the design cert reviews on I&C and they're going to have a chapter 19. I don't know if they've got one yet.

MS. MROWCA: No, there won't be a design-specific review standard on chapter 19. They'll be referring to the current SRP 19.0.

MEMBER BLEY: Okay. So that would say things are linked. So that would be good.

MS. MROWCA: Yes. But the main reason, technology differences and to incorporate risk insights, if they have them.

MEMBER BLEY: Yes.

MS. MROWCA: In the case of chapter 7 on I&C, they really could have updated their standard review plan, because again that would tend to be more generic, but I think they wanted to do some kind of trial use and the design --

MEMBER BLEY: Yes, I think that would be coming. I think that will look a lot like what they did, yes. Okay.

MS. MROWCA: Yes, the design-specific

review standard was a good way for them to do that.

MR. HARRISON: Okay. Back to my things that this ISG is not to cover. It's not to cover risk-informed applications. So again, this was one of the concerns we had when we were looking at the ASME/ANS draft appendix a year ago was the concept that they might try to use that as the basis for doing a risk-informed application like risk-informed in-service inspections or a risk-informed tech spec. We're saying it's not for that.

Each of those applications has its specific guidance and its expectations of what level PRA technical adequacy you need for those applications.

MEMBER BLEY: I hate to interrupt you with more of the same stuff, but this is for a Part 52. What if an advanced reactor comes in with a Part 50? Would this apply?

MR. HARRISON: There's a whole --

MEMBER BLEY: Have you ever thought about that?

MR. HARRISON: Yes, there's a second --

MEMBER BLEY: I hear rumblers that some might, you know?

MR. HARRISON: And, Lynn, you can answer this better than I can, probably. But there's a SECY paper that went up to the -- was it a SECY paper that went up to the Commission that talked about the differences between Part 52 and Part 50 and --

MEMBER BLEY: But I guess if they come in under Part 50, they don't have to do a PRA. And somebody recently confirmed that that ought to stay that way.

MR. HARRISON: Yes.

MEMBER BLEY: Yes. So I'm sorry. I lose the thread once in awhile.

MR. HARRISON: That's fine. But again the point is an application, a risk-informed application has specific guidance on how to address that and what level of PRA quality you need for that application. And that's all based on the current standard, so it would be confusing to try to use this appendix to try to interpret what it means to be Capability 2 and add standards when you're coming up with alternative requirements for this standard.

So we're saying if you want to do that, you need to go address the current standard. And

that's the last bullet there. These PRA should address the endorsed standard as appropriate for the application.

The other note is the scope of this ISG is for just the typical conditions that we would expect at a design cert or a COL. The industry and the Standards Committee keeps telling us that design certification is a U.S.-centric term. Okay. It's a design without site information. That's the generic term. A combined license is a design with site information. So you can address it that way. But it's for the typical conditions. We don't expect a design cert to come in with only site-specific parameters. They're going to have a more generic basis to them.

Combined license we're assuming is a typical first-time-through-type of license. You don't have 20 AP-1000s already operating to build your PRA off of. It would be the first couple.

CHAIRMAN STETKAR: Standards folks apparently aren't aware of Great Britain, but that's okay. They have a very similar process.

MR. HARRISON: So, some background. This is just background on the PRA standard. We can go through this fairly quickly. It's endorsed

in Reg Guide 1.200, Revision 2. It was developed based on the current operating fleet, therefore it uses language -- because they already knew what the plants had. It does not specifically address advanced light water reactors or the pre-operational phase where you don't have procedures and you don't specific information on certain features, and it doesn't address Part 52 licensing. It doesn't address large release frequency, because the current fleet was based on large early release frequency, LERF. So there's no discussion on LRF.

The standard establishes high-level requirements, and then within each high-level requirement is a series of individual supporting requirements for what should be in the PRA. It's not the methodology of how you do the PRA, but it's the elements or the aspects of what should be in the PRA. So it would talk about you should have human error probabilities, not go use this computer program to calculate the probabilities.

Okay. This gets us to the general topics that are the main textual part of the ISG, the first 10 pages or so. We basically broke down into six topics some general considerations for the use of the ISG. And we'll go over these briefly.

They're the scope and capability of the PRA, the PRA configuration control, peer reviews and self-assessments, operational guidance and practices, large release frequency, and then there are what I refer to as technical challenges for the PRA because of this phase.

The technical challenges are then further broken down into eight topics. There are site-specific features and characteristics that are a challenge. There's the screen of events and hazards for analysis. There's plant-specific layout and capability information, plant-specific operating experience and data, plant-specific guidance, interviews, walkdowns, and then the treatment of uncertainties. Those eight topics represent the technical challenges that we saw with the current standard being applied to a pre-operational phase of an advanced light water reactor. So we'll come back to those after we go through the other material.

Scoping capability of the PRA. The standard review plan, 19.0, has a statement in there that the PRA for the pre-operational applications should generally be acceptable if they meet the high-level requirements and the applicable

supporting requirements at Capability Category I of the standard. And if I can do this hopefully -- again, if you haven't seen this standard, what you have here, like on ASA-9 there's a place where there's three different capability categories that are laid out.

CHAIRMAN STETKAR: If you look at the top of the page there you see the -- there.

MR. HARRISON: Oh, there you go. Thank you. So there's a Capability I, II or III that a person could use in categorizing. You'll see a number of these go across all three. That means you just meet that requirement or you don't meet it. You don't really get a -- you're not supposed to say you get a great for that, but you'll hear say I meet Capability Category III. What that really means is they met the requirement. Those are just -- you have to do those. And an example of that would be like A-2 there where it says "for each model to initiate an event, identify the key safety functions that are necessary to reach a safe stable state and prevent core damage," which is a --

CHAIRMAN STETKAR: Now I get to ask my question and reiterate. I'm sure you're all aware

that in July ACRS wrote a letter and one of our recommendations -- it was on the SRP Chapter 19, but one of our recommendations said, quote, "The staff should consider revised guidance that endorses probabilistic risk assessment conformance with ASME/ANS Capability Category II requirements to the greatest extent achievable at the design certification and combined license stages of the licensing reviews." So we're on record of advocating not Capability Category I, but Capability Category II. You're now in print advocating only Capability Category I, whereas preceding the ISG it was in a footnote and sort of general guidance. That's a distinct difference in our viewpoint.

However, my question is you've now gone through a point-by-point, item-by-item through the whole standard comparison, every single line item and made a determination of whether or not someone at the design certification or COL stage can meet or not meet Capability Category II and what might be required to meet Capability -- I'm sorry, Capability Category I and what might be required to meet that. Have you gone through and done some more comparison with Capability Category II?

Because it strikes me that there isn't that much difference.

MR. HARRISON: No, and I -- yes, the note was -- and I can't remember the exact number, but there's like 40 supporting requirements that distinguish I and II. There's not a great number.

CHAIRMAN STETKAR: But my point is; and I might as well get the philosophy out of the way early because I want to talk about specifics later, in many cases the philosophy that you provide in your clarifications and comments for Capability Category -- I hate to use the term "compliance," but to be in accord with Capability Category I requirements apply equally well to Capability Category II. I don't have any plant-specific data. I don't have any plant-specific data. I can use generic data for Capability Category II. I can use generic data for Capability Category I. Because both of them say use plant-specific data. So I don't get why we have to focus on Capability Category I.

And the reason that I bring this up is that applicants; and I can say this because we're not the record, will invoke lawyers who will invoke the least common demanded denominator. And if they

can say we are only required to do this because it's only required to do Capability Category I, we are not required to do that. Therefore, we will not do that. And there are some statements in the ISG that sort of reinforce that notion.

For example, in the ISG -- if I can find this. Bear with me. I have a lot of notes here. "Applicants are also not expected" -- this is in the background -- "not expected to have detailed design and operational information such as cable routing information, operating and maintenance procedures and design-specific or plant-specific operating experience and data." That's good. "If an applicant has more detailed information, then this enhanced capability should be reflected in its PRA and application."

Now, that says if you have more, put it in there. I'm going to say I don't have it because I don't need to have it, because you didn't tell me that I needed to have it. So I don't need to do any more. See the difference?

MR. HARRISON: Yes. Well, I understand what you're --

CHAIRMAN STETKAR: If you tell somebody that they need to comply with Capability Category

II and note the places where they don't and provide guidance about, okay, you don't have plant-specific data. Use generic data. Get over it. It's a much different bar. And then I don't think technically it's a much different bar. I think it's a state-of- mind different bar. Rather than saying do the bare minimum and where you can do better on your own initiative, go do it, but we're only going to hold you to the bare minimum versus do the state of practice and where you can't achieve that, tell us why you can't. That's a much different approach to doing the risk assessment. So why don't you take that latter approach?

MR. HARRISON: Philosophically I started with where we were already. And again, the SRP already had the note that that was the staff expectation and the position. So that was my starting point.

CHAIRMAN STETKAR: And that has resulted in a broad variability in the quality, scope, level of detail in what we have. So that's working really well.

MR. HARRISON: No, I hear you. But that was the ground rules that I was playing under in developing the ISG was that we weren't going to

create new requirements or new positions, that we were going to start with the positions and then look at that within the current context of the standard.

And, Lynn, are you wanting to add or --

MS. MROWCA: I think we thought about that philosophically, too. And I think there's an opportunity where we can actually discuss this because once this goes our for public comment we'll be having a public meeting somewhere in between. And so we can broach that idea. As a regulator I'm not sure philosophically which way you should go, because as a technical person I totally agree with you you should give them the stretch goal and have them explain why they can't meet it. But as a regulator I'm not sure if that's consistent with our philosophy.

MR. HARRISON: Yes, because if you remember the whole philosophy of the risk-informed approach was the technical adequacy of your PRA needed to be commensurate with the application.

MS. DROUIN: Okay. One of the things though is that currently right now in Regulatory Guide 1.200, if you go to the appendices where we've endorsed the standard, we do say in there

that we've only reviewed the standard for Capability Category II, and that's the only part we have endorsed. And somewhere in the Regulatory Guide we talk about that we've only looked at Capability Category II because we believe all the applications really need a Capability Category II PRA.

CHAIRMAN STETKAR: What do you think, Mary, the public's expectation is when they read this stuff? I mean publicly the NRC is saying, well, we have this new technology -- new now -- 30-year-old technology called risk assessment. And indeed we have risk-informed regulations, and we are requiring by law that all new reactors do a comprehensive assessment of their risk by looking ta all hazards, all operating modes as part of the design certification and combined license stages, and even further enhancements before they load fuel. Wouldn't you think the public would believe that that's a fairly decent risk assessment and not just something that's a bare bones simplified Capability Category I? I mean, honestly?

MS. DRUID: Okay. I think what has happened is that --

CHAIRMAN STETKAR: I can say this

because we are not on the public record here.

MS. DRUID: -- too many times we think we need this detailed PRA for all risk applications, and that's gotten us into a lot of trouble and is one of the reasons I think industry is upset by this. There are many times we just need to know whether or not something is a risk contributor at a hazard level and we don't necessarily need to know what are all the drivers. And we don't allow that with this standard. So how do you correct that problem?

And I think that's one of the reasons why we get this pushback from industry, because sometimes just to answer the simple questions we force them to do this very detailed analysis. And when the capability categories were developed -- you hit the nail right on the head because it was management that stepped in from the industry side and said, well, what if I don't need to do that? They still wanted to be able to say I met the standard.

So this Capability Category I was created so that if there was something -- even though the standard allows you not to meet something, if it's not needed for the application -

- getting into what Donnie said that it has to be commensurate with the risk. We really have not between industry and the NRC allowed for a risk assessment to be something less than a full-blown, all-the-bells-and-whistles PRA. And I think that carries over into then these capability categories.

MR. HARRISON: And if I'm hearing you correctly, John, what you're basically saying, it's almost a philosophical approach. Do you start at II and let people justify coming in less as opposed to coming in at I and hoping they do better?

CHAIRMAN STETKAR: You don't deny their license because they can't meet Capability Category II. You just simply force them document why they can't. I can't do it today because I don't have any plant-specific data. Okay. I'll buy that. I don't want to put this valve in my system because I'm lazy. That's probably not a very good justification. I think I'll write a question on that one.

MR. HARRISON: And I hear --

CHAIRMAN STETKAR: But at least I wrote it down. I didn't want to put it in there because I'm too lazy.

MR. HARRISON: And we're aware of about

the 40 SRs that -- where they do have a distinguishing factor.

CHAIRMAN STETKAR: And that's all there are in the whole thing? Because I'm not --

MR. HARRISON: It's about 40.

CHAIRMAN STETKAR: -- intimately familiar with the whole --

MR. HARRISON: Yes, well, once you get to the external hazards, they --

CHAIRMAN STETKAR: Sure, they tend to go across the --

(Simultaneous speaking)

MR. HARRISON: -- go across, or they don't even have a Capability 1.

CHAIRMAN STETKAR: And a lot of the stuff is in the nuances in the data and --

MR. HARRISON: Right.

CHAIRMAN STETKAR: -- treatment of data.

MR. HARRISON: Right. So if you've addressed it up in the first part, you've mostly likely caught most of the --

CHAIRMAN STETKAR: Yes.

MR. HARRISON: -- distinguishing features by the time you get through internal

floods.

CHAIRMAN STETKAR: That's something that came to mind, is did you look at how many places would you really have difficulty in terms of distinguishing -- in the way that you have -- I think the ISG is laid out actually pretty well -- in distinguishing the clarifications and comments instead of saying, well, to meet Capability Category I you can't -- right now it says you can't meet Capability Category I in terms of every letter in that particular supporting requirement, but you can meet the sense of it by doing this. How much different would it be if you looked at the middle column?

MR. HARRISON: And my sense of that is like on data it wouldn't make a difference because you don't have -- the reason you can't meet Capability Category I often is because you don't have the plant-specific data.

CHAIRMAN STETKAR: Right.

MR. HARRISON: Or if it's asking for operating procedures, it's just that more so in Capability II.

CHAIRMAN STETKAR: Sure. That's right.

MR. HARRISON: So if you can't meet it

in I, you're not going to meet it in II. And if we let you use operating guidance instead of procedures, that's going to be the same logic that goes into II.

CHAIRMAN STETKAR: But some of the stuff that I've questioned applicants about, why didn't you put -- I see a valve on a P&ID. Why didn't you put it in? It's not required for Capability Category I. You don't need to look at spurious closures of manual valves, for example, so I didn't need to put it in there because I only needed Capability -- the valve was there. It doesn't take any -- I mean, as an analyst it takes me two minutes, if that, to put a basic event in my fault tree and I've solved that problem.

MS. DRUID: Yes, well, what happened was the standard was originally written by 10-20 people each going off on their own. And it had been determined -- I mean it was first written -- it was written to one capability and it was getting ready to go public, but then -- I won't -- anyway, that changed. So then they came back and rewrote the standard and about 10 different people, at least 10 different people were involved.

And I stepped in. The NRC stepped in

and said, well, wait a second. Our biggest criticism is that you had absolutely no consistency from requirement to requirement across these capability categories. And all the different authors all had different definitions of what Capability Category I was, II and III. They each thought of it as something different.

So then what happened is they backfitted. And that's why sometimes you see across these capability categories it doesn't make sense because originally they were all written -- and I even couldn't begin to tell you how somebody defined the different capability categories, but we sat back and we said, okay, what distinguishes you on a PRA? And we said, well, okay, the level of detail, the amount of data and how realistic it is. So whether or not those were the right distinguishing attributes for your capabilities, I don't know, but that was the best that was thought of at the time.

MR. HARRISON: And just to come back around, in parallel to this effort we're also working with the standards through our project teams to addressing -- IE-C7 is one of my favorite SRs because it makes a point. Capability Category

I and II, no requirement for time trend analysis. Right? So if someone comes in and says I meet Capability III, well, that was the only capability category you could meet. Doing nothing got you I and II. Right? So if someone comes in and says it, now here's the funny part: When you read Capability III, "Use Time Trend Analysis," and you get all the way down, "Acceptable Methodologies for Time Trend Analysis" can be found in NUREG-5750, 6928. Those are generic data sources.

CHAIRMAN STETKAR: Right, and I don't remember much time trend analysis in those generic rules.

MR. HARRISON: No, they've been revised. And there's a discussion of time trend analysis within the generic database now.

CHAIRMAN STETKAR: Is there?

MR. HARRISON: So I looked up those references and there's a discussion, at least in one of those two references, about time trend analysis for generic data. Right? So if I use generic data and I use it from that source, I meet Capability III. That makes absolutely no sense. That should be all the way across, right? We're working with the Standards folks to catch things

like that and try to fix it.

CHAIRMAN STETKAR: We probably need to go -- I had to get this out. The reason I had to get it out is because I don't remember when we learned about this ISG. I know it came up in one of our meetings and we said, oh, you're developing an ISG? We'd like to hear about that. And it came up in this context of the Capability Category I and II and we got a lot of kind of nodding of technical heads saying, yes, there seems to be support for Capability Category II. The fact of the matter is the ACRS has written a formal recommendation and we haven't heard back yet from you, at least formally. I don't believe we have the --

MS. MROWCA: We finished the letter. It was signed off I think by the EEO a couple weeks ago.

CHAIRMAN STETKAR: Oh, we haven't gotten it.

MS. MROWCA: Oh.

CHAIRMAN STETKAR: We'll get it probably in terms -- before our October meeting.

MS. MROWCA: Okay.

CHAIRMAN STETKAR: I know we didn't have it for September.

MS. MROWCA: I think just one more thing: You always step back and think high-level. I mean, as a technical person I totally agree with you, you might as well pull rather than push people when they're doing the PRA, but when it comes to what you're going to use it for, I guess the bottom line is if we have Capability Category I, are we missing something at the design cert stage versus like if you're going to do an application, we say Capability Category II? So despite what you do, then later they will have to

have --

(Simultaneous speaking)

CHAIRMAN STETKAR: We're not on the public record. ESBWR did not have spurious opening failure mode in their PRA for -- and I've forgotten what the squib valves are that dump the water from the GDCS pools down into the sump for their core cooling stuff. It wasn't in there. We said how come it's not in there? Spurious opening of those valves is not required for Capability Category I. Well, what would happen if you put it in there? Because it would dump the only source of core injection water into a place where you can't recover it. Oh, that could be important.

MS. MROWCA: And important insight.

CHAIRMAN STETKAR: So can it have? Yes, it can, because there's --

(Simultaneous speaking)

MEMBER BLEY: BLEY: And in fact --

(Simultaneous speaking)

CHAIRMAN STETKAR: Right.

MEMBER BLEY: -- in the PRA to change your design.

CHAIRMAN STETKAR: Right. There's at least one example that I know where it did. So the answer is yes.

MS. MROWCA: And so --

(Simultaneous speaking)

CHAIRMAN STETKAR: -- their initial argument was it's not required for Capability Category I.

MS. MROWCA: And if it was II, then it would be in there.

MR. HARRISON: Right. Because, yes, II it probably had the phrase "if it can be a significant contributor," or something like that.

CHAIRMAN STETKAR: You'd have to at least look at it --

MR. HARRISON: You'd have to look at

it, yes.

CHAIRMAN STETKAR: -- to justify why you didn't

MR. HARRISON: Yes, and --

CHAIRMAN STETKAR: And that's the difference. Looking at it and justifying -- many cases the effort that it takes me to justify why I didn't put something in the model is a lot more effort than just putting it in there.

MS. MROWCA: Yes.

CHAIRMAN STETKAR: Not putting it in there in the beginning if I don't put it in, I don't have to justify why I didn't put it in because I don't have to put it in and I don't have to justify it.

MS. DRUID: We have raised that exact argument many times with these Standards people, that all this effort they use to not do something is a lot more effort if they just did it. Because in order for you to understand whether something is not significant, you got to do something with it to screen it out.

MEMBER BLEY: Well, I might as well join in the whining here.

(Laughter)

MEMBER BLEY: The other thing that bothers me about it is they're making a hell of a lot more work for themselves to get the before-start-up, before-fuel-load PRA done right, and it's going to take a lot more inspection of that PRA to be convinced they've put in the stuff they left out early on. And I think they'd have trouble with it because the people who did it won't be around anymore.

CHAIRMAN STETKAR: Yes, that's right.

MEMBER BLEY: In fact, they aren't.

CHAIRMAN STETKAR: I think there may be COL holders now that suddenly have a big surprise when the inspections come look at the fuel load PRA and say where's this stuff?

MS. MROWCA: I think you made it clear to one applicant during ACRS meetings. Very clear.

MEMBER BLEY: Yes, I want to ask you something totally different, because I don't see anywhere on the slides where it comes up and I didn't see anywhere in the ISG, and it's a thing that does worry me. This ISG is for advanced light water reactors. You don't define that anywhere.

MR. HARRISON: Right.

MEMBER BLEY: You kind of said, well,

the passive things and things like that. It seems to me whatever "advanced" means is important if it's going to be the basis for the ISG. And if "advanced" includes passive designs, there's something -- not 100 percent -- there's something that almost none of the passive designs have included in their PRA in a meaningful way, and that's the very idea of it being passive. If it's passive, it's relying on phenomena, phenomenology to make itself work rather than pumps and that sort of thing. And there are conditions over time that can change, that can affect that.

And I haven't seen, except in one minor case, any of these that even give lip service to the fact that they ought to be looking at the phenomena that might interrupt operation of the passive systems. And if I were to make a bet, if we ever have a problem with one of these, that's going to be an area where it crops up. And if it's not in the PRA and if it's not in the ISG, what does the ISG got in it that's helping us with the passive plants different from what we're already doing with PRA?

Now, I don't think you need it. I think I can use the current standard and interpret

that I have to examine those things, but it isn't being done and we don't have a complete PRA that would actually have looked at this, which is what people say, oh, we don't -- we haven't gotten to that yet.

MR. HARRISON: But I think on the --

MEMBER BLEY: I don't know what you're thinking about this, though.

MR. HARRISON: -- AP-600, when Nick was here he did a -- Nick Soltis -- he did quite a bit, I thought -- and again, I'm going back to 2007, or something like that, time frame --

MEMBER BLEY: I saw one thing in that PRA, and it said you might worry about the film breaking up on the steel shell, where you're relying on that film cooling. And then it says but that's not likely. That's the analysis. And there's a lot of various things that we're relying on that all sorts of things could affect over time from maintenance to just degradation, or maybe a fire somewhere in the plant and you get smoke coating or deposits.

And if we're really looking for the risk, that ought to be in there somewhere. And I don't see it here. I don't see it in what people

are doing. And we've commented on it, but just briefly in each of the design cert rules saying before you finish this ought to be included. But how come we're not talking about it?

MR. HARRISON: My personal --

MEMBER BLEY: Yes.

MR. HARRISON: -- perception, if you're crediting a passive feature, you should model it.

MEMBER BLEY: I buy that, but we don't -- but here's the advanced --

(Simultaneous speaking)

MR. HARRISON: But --

MEMBER BLEY: -- guidance and it doesn't say anything about it.

MR. HARRISON: And again, this is one of the -- again my personal perspective is I see sometimes the PRA standard is being used backwards.

MEMBER BLEY: Yes.

MR. HARRISON: You're supposed to go off and build a PRA. It's supposed to have certain elements in it. You're supposed to do the best job you can in building a PRA. This is the 1980s philosophy, apparently. '80s and '90s. You didn't need guidance to tell you how to build a PRA, right? We had guidance. We had NUREGs that told

you. And you used that guidance and did as good as you can. The standard is a good check to come back and say I've built it; now let me look at it and see how well -- did I miss some feature that I should have had in my position that I missed?

Again, that kind of gets to the comment John was making. Someone doesn't model spurious actuation of a valve. I'm a purist. I would say build your PRA and if you've got valves and spurious failure could cause a problem, you should have modeled that. You don't need the standard to tell you to do it or not to do it. It just becomes how good is your PRA?

MEMBER BLEY: But we do have a standard and now we have guidance explicitly for advanced reactors that's silent on that whole area.

MR. HARRISON: Well, it's kind of like this is my analogy: I used to umpire baseball and softball, right? Rule No. 1 of an umpire: You never take the rule book to the game.

MEMBER BLEY: Right.

(Laughter)

MEMBER BLEY: Well, we always thought of it as a team.

MR. HARRISON: And it's a team. That's

right.

(Laughter)

MEMBER BLEY: But you're right, I never had the rule book in my back pocket.

MR. HARRISON: You never bring the rule book to a game. And if someone walks out with a rule book, I throw them out of the game.

(Laughter)

CHAIRMAN STETKAR: Because you're running the game.

MR. HARRISON: This is my game. This is my rules. We're playing by my rules. There may not be a fence out in the left field, but here's what we're going to do today for that rule. Unfortunately what people are doing is is they're using the rule -- the other analogy is when you start a class in college and the teacher gives you -- here's what I'm going to examine you on at the end of the year. I don't need anything else. I just read that, right? I read the syllabus and that's it.

MEMBER BLEY: We're telling people a lot of stuff here.

MR. HARRISON: Well, and so the problem is is if I start with the answer, people then start

using that as the basis instead of doing the right thing and --

CHAIRMAN STETKAR: This as a cookbook now?

MR. HARRISON: Right, and that's not supposed to be done that way.

CHAIRMAN STETKAR: Okay. To meet LEC 2, I need to have an attorney interpret what include conservative -- oh, conservative? I need to have an interpretation of what that is versus treatment of feasible. What is a feasible -- I need to have an attorney. And as long as my attorney interprets the fact that I am meeting every word there, I check off the box by doing it. Okay. Now, let's go to LEC-3.

MR. HARRISON: Right. And the intention is not to use the standard that way.

CHAIRMAN STETKAR: But people are.

MEMBER SCHULTZ: And I'll give you one more, Donnie,; and it ties in I think what John has brought up and what Dennis has just addressed, and that is the other addition that you've incorporated here in all kinds of different places is treatment of uncertainties, and you list it as a technical

challenge. Well, it sits there as a phrase that this is something that now must be done, treatment of uncertainties. And it's broad enough so that it would incorporate what we've discussed in terms of model uncertainties; it says that in several of the places, as well as uncertainties due to the fact that you're not addressing Category III and II. You're addressing Category I.

However, there's not enough specificity in the discussion of what one is intended to do there to prevent the applicant from doing what John is saying and saying, well, I didn't have to -- I don't have to really do a real bang-up job on treatment of uncertainties because I only have to do Category I. So there's the intent, I think, to capture a lot of good information in asking for that, but there's not enough that's specified to suggest that someone really needs to take that seriously and not -- can't bring the lawyers in.

MR. HARRISON: Right. Well, and again that was -- I didn't say it because I was afraid of the response I'd get, but John's comment about the valve, I mean, hopefully if they had followed the standard, they should have been documenting that as a model uncertainty or a simplification in the

model that could have impacts. But apparently they didn't even do that.

MEMBER SCHULTZ: It also goes to the point of if I would incorporate what I have available and incorporate that, then I don't to do the detailed uncertainty analysis that seems to be called for in order to answer that portion of the documentation for the requirement.

MR. HARRISON: Yes, that's kind of what we're pointing at is the documentation. Write those things down and tell us what it impacts and what you can't do now because of that.

MEMBER SCHULTZ: So it would be easier to incorporate them --

MR. HARRISON: Right.

MEMBER SCHULTZ: -- rather than have -- so, but again, I didn't see in the guidance, or in the instruction, I should say, to the staff that this is a real serious point. Rather, it's still listed as a technical challenge. So without that additional guidance to the staff I don't think much is going to happen there except broad reaching statements about the uncertainty is well within the bounds of, you know, plenty of margin, those types of things.

MEMBER BLEY: I'm just going to make one last pitch on this thing. In level 2 we're all focused on phenomenological effects. In passive system performance we ought to be thinking about phenomenological effects that could interfere with it rather than just a broken pipe or something like that. And nobody's ever done it, so there's nothing out there to alert people that, hey, this is a new thing and you ought to pay attention to this and do a good job on it. Well, at least pay attention to it. And even in the Category I, you ought to say you might have to look at this later, but here's the things that could go wrong in general. And I'm just bothered by not having any flags raised anywhere that I can find except three or four ACRS letters that are in the files.

MR. HARRISON: On your advanced light water reactor I believe the title of Part 52 is "Advanced Light Water Reactor." That's why it wasn't worded --

MEMBER BLEY: I mean, is that true?

CHAIRMAN STETKAR: EPR becomes APWR advanced light water --

MEMBER BLEY: Are advanced light water reactors?

CHAIRMAN STETKAR: -- even though they're active --

MEMBER BLEY: Nevertheless, it includes passive design?

CHAIRMAN STETKAR: Yes, it also includes the EBWR and AP-1000.

MR. HARRISON: And the small modulars would be under there as well. And so --

MEMBER BLEY: Well, you're giving me something to do for the next two minutes. Perfect.

MR. HARRISON: I think that's entirely acceptable.

MS. MROWCA: One thing that's interesting to note, too, is that we were -- last week Donnie and I were at the Joint Committee of Nuclear Risk Management and in discussing this --

MEMBER BLEY: Could you just define that for us?

MS. MROWCA: The Joint Committee of Nuclear Risk Management, the PRA Standard Groups.

MEMBER BLEY: Okay.

MS. MROWCA: The ASME/ANS who developed this standard --

MEMBER BLEY: Thank you.

MS. MROWCA: -- and all the writing

groups. And we were talking about this standard and they said, gee, we really should have changed the name. Instead of having an advanced light water reactor standard, we're really focused on the pre-operational phases. Because this could apply to a current design plant that is like a Watts Bar that's going into operation. So it's kind of interesting that although the title might evoke something like you need to treat passive systems or discuss them in the standard, I think the standard writers thought maybe that's not really the focus of this standard.

MEMBER BLEY: My question though was about this ISG.

MS. MROWCA: Yes. Well, this ISG is supposed to take the place of that standard until it can hit the streets. So it's really also focused on the pre-operational phases because Part 52 kind of gets you to that place where you can't use the current standard for everything.

MR. HARRISON: And the Standards folks are not going to be Part 52-centric. They're going to be -- again, they want to use more general terminology about designs without site information, or designs with site information.

MS. MROWCA: To be able to be more applicable internationally, that's something that's in their mind.

CHAIRMAN STETKAR: We should probably let Don get on with his --

(Simultaneous speaking)

MR. HARRISON: We've got all afternoon. Okay.

CHAIRMAN STETKAR: You'd be surprised. Some of us have all evening, too.

MR. HARRISON: Oh, okay.

(Laughter)

MR. HARRISON: Okay.

CHAIRMAN STETKAR: I still have yet to challenge Dr. Powers' 9:00 p.m. --

(Simultaneous speaking)

MR. HARRISON: Oh, okay. Hopefully we move quicker.

Past our focus being judging Capability Category I, we note that there are some SRs that don't identify any action, like I did on the IE-C7 at Capability I. There's nothing there. It just says don't do anything. Sometimes that's conservative. Sometimes it's not conservative. What it really means is Capability Category I is

simplified. Well, simplified can be conservative and non-conservative. So IE-C3 is an example where it's conservative. IE-C3 -- I -- LE, that's LRF-C3 is no requirement to address repair. If I don't address repair in my model, I'm not taking edit for it; therefore, it's conservative.

If you want to take credit for it, it gives you a long thing about having to justify the credit and you have to have data and all this stuff. Right? So if you say you're going to meet that at Capability Category I, you're actually conservative because you're not taking credit for repairing of equipment. Right? So that's a conservative simplified approach. However, you then will have something like -- under the success criteria C -- well, that's easier. Let me do it this way. SC-B2. CHAIRMAN STETKAR: Just do a search on it. It will flip to it real easy if you do a search.

MR. HARRISON: I was hoping I was close.

CHAIRMAN STETKAR: No --

(Simultaneous speaking)

MR. HARRISON: There you go. There you go.

CHAIRMAN STETKAR: -- than you think.

MR. HARRISON: So SC-B2. For context, Capability Category II and III do not use expert judgment except when you don't have data. Right? Makes sense. Capability I says there's no restriction. You can use expert judgment any time you want to. Right? That's not conservative potentially, because now I could have data that says the failure rate is a certain thing and I'm going to have an expert come in and say, no, it's not. It's something less. That shouldn't be allowed, first of all. But second of all --

(Laughter)

MR. HARRISON: -- the fact that it's there --

CHAIRMAN STETKAR: So what's your opinion?

MR. HARRISON: Yes. You should only be using expert judgment when you actually don't have the data or you have a question about the data that's being used.

So in that situation that should really -- we would look at that and have a clarification that says you should actually be striving to do Capability II in that example, or II/III.

And so in those cases we evaluated -- when there was no requirement or no action required we looked at the other Capability categories, either a II or a II/III or a III by itself and said what's the appropriate thing that the applicant should actually be pursuing in those cases.

We also note in Parts 7 and 8, at least on the hazards assessment part, it has -- for Capability Category I it uses the phrase "not defined." And again, that's because they assumed that you got through Part 6, which was the screening process, that if you couldn't screen out and you screened in to having to do it, well, you must want to do it at Capability Category II.

Part 9, which is the other hazards; it's the more generic process, has information for Capability I because it assumes that you can still do a conservative analysis for that hazard. It may not be much more than what you did for the screening, but you can still do that. So again, since our target was Capability Category I, we said when you do Parts 7 and 8; 7 being high winds, tornadoes, and 8 being external floods, that you should look at the guidance in Part 9 for that they're -- the text.

CHAIRMAN STETKAR: There is a wonderful paragraph that if you wrote it, you ought to get your law degree. If an attorney wrote it, I understand it. I had to go back and look at the guidance and your clarifications to understand what the paragraph meant.

MR. HARRISON: Oh, dear. I think --

CHAIRMAN STETKAR: I'll quote it to you. I wasn't going to bring this up, but since you --

MR. HARRISON: Since I did --

CHAIRMAN STETKAR: -- decided to, I will. I will quote you the paragraph.

"As noted in ASME/ANS RA-Sa-2009, Section 7-2, the fact that the high wind events are not screened out per the screening criteria in Part 6 (as modified by the comments provided previously on Part 6), the supporting requirements in this part typically correspond to Capability Category II (i.e., Capability Category I would involve the simplified and/or conservative screening approaches identified in Part 6). As a result, many supporting requirements in this part designate Capability Category I as not defined. However, consistent with the discussion in Part 9, Section

9-2 for other external hazards, it is acceptable to introduce conservatisms in any step as long as the impact on overall CDF and LRF is evaluated and the associated uncertainty addressed. Where simplifications and conservatisms are used, the supporting requirement would be more appropriately considered Capability Category I. Therefore, the staff expects DC/COL applicants to develop high-wind event PRAs if necessary considering the parallel generic supporting requirements of Part 9 for achieving Capability Category I."

Believe me, I read that about a dozen times and I couldn't figure out what the heck it was saying. I could figure out once I got back into the guidance sort of what you were looking for, but it is darn confusing.

MR. HARRISON: I think there's probably a similar paragraph on Part 8.

CHAIRMAN STETKAR: That was for Part 7. On Part 8 there's an identical paragraph and you really ought to -- I wasn't going to bring this up, but you goad me. You really ought to change in Part 8 the phrase "high-wind PRAs" --

MR. HARRISON: I thought we corrected that.

CHAIRMAN STETKAR: -- to "external flooding event PRAs" --

MR. HARRISON: That's not in our version.

CHAIRMAN STETKAR: -- because when you copy and paste --

MR. HARRISON: Ah, not in your original.

CHAIRMAN STETKAR: -- you ought to at least change the subject.

MEMBER BLEY: Do we have their version? Is that --

(Laughter)

MR. HARRISON: I'm looking at -- oh, that's Part 9.

CHAIRMAN STETKAR: Anyway, go on.

MR. HARRISON: I didn't catch that at one point in Part 8, so I may have not corrected it and not corrected it. But, yes.

CHAIRMAN STETKAR: We actually got this a few weeks ago, so you might have picked it up.

But essentially once I looked at the guidance I understood what you were heading for, but it's confusing.

MR. HARRISON: Yes, and that's probably

me sythensizing a number of comments and making one long legal paragraph, right? I'm just looking to see if we still say high --

CHAIRMAN STETKAR: As long as you ignore the introduction and go to the actual guidance, somebody ought to get what you're looking for, but --

MR. HARRISON: High-wind still is in there, by the way.

CHAIRMAN STETKAR: -- I would almost -- anyway, that's --

MR. HARRISON: Okay.

CHAIRMAN STETKAR: -- real whiny, but you brought it up.

MR. HARRISON: NO, that's fine. Okay. Moving on. Part 10, Seismic Margins Analysis. It's not endorsed by Reg Guide 1.200. We don't endorse it here. However, in the pre-operational phase most applicants are expected to follow the guidance that's in the DC/COL ISG-020, which is a PRA-based seismic margins analysis approach.

CHAIRMAN STETKAR: I didn't look ahead in your -- are you going to talk more about the seismic stuff later?

MR. HARRISON: No.

CHAIRMAN STETKAR: You're not.

MR. HARRISON: I wasn't.

CHAIRMAN STETKAR: Okay. Well --

MR. HARRISON: As soon as we get --

CHAIRMAN STETKAR: -- time for more whining.

MR. HARRISON: Okay. So, yes, you're going to see the seismic area. For all the seismic hazard analysis part it basically says don't do this, go do ISG 20.

CHAIRMAN STETKAR: But my question is, Donnie, I understand -- the guidance goes further than that. Let me get my seismic notes here. I had some real problems, quite honestly, with the seismic discussion. The seismic introductions says, "The seismic event analyses used to support DC applications addressing 10 CFR 52.47(a)(27) and COL applications addressing 10 CFR 52.79(a)(46) will be based on the PRA seismic margins approach. That to me is a statement from the NRC staff saying that I must use a PRA-based seismic margins approach in my design certification and COL PRA.

Now in practice I can understand why there's a lot of incentive to use that approach at the design certification stage where I don't have a

site-specific hazard of a ground motion response factor. At the COL stage I have hazard curves and I can develop fragility curves. And I don't see a reason why I can't at the COL stage do a seismic PRA. This tells me I cannot.

MR. HARRISON: And that --

CHAIRMAN STETKAR: This tells me that I will use that --

(Simultaneous speaking)

MR. HARRISON: And that's an error on my part. Because if you get to the end of that same paragraph, the sentence is, "For COL applications site-specific hazard information will be available to address the seismic hazard supporting requirements directly and/o confirm the DC hazard analysis bounds." In other words --

CHAIRMAN STETKAR: Sure.

MR. HARRISON: -- their function.

CHAIRMAN STETKAR: Yes. And if I'm an applicant, I have an option, but you told me I will base it on the seismic -- this is the way people think. It says you will use this. Sure, I have an option. I'm not going to do all of that optional stuff because that's a lot more work.

MEMBER BLEY: But even if you do --

just an example: Way back a long time ago one of my clients; I was working for the utilities, we did a complete analysis. I think it was during IEEE or something like that. But when they went to sent it said, they said, oh, this only asked for this much. If we send the whole thing, we'll be unresponsive. So we can't send the whole thing. We have to go rewrite it to this limited scope. And I actually did that and send in the limited one because, as John says, those people said, well, we'll be considered unresponsive and we'll get in trouble.

MR. HARRISON: Yes, that opening sentence should be "will like be based," or "should be based."

CHAIRMAN STETKAR: I don't know --

(Simultaneous speaking)

CHAIRMAN STETKAR: Why do you talk about it? Why is it necessary to -- the problem is throughout the guidance then you constantly make reference in every single line item to DC/COL ISG-020, which is PRA-based seismic margins analysis regardless of whether it's a DC or a COL. And I'd like the staff to explain to me why at the COL stage I cannot perform a seismic PRA.

MR. HARRISON: And that's an error.

It's --

CHAIRMAN STETKAR: What am I missing that I need?

MR. HARRISON: Yes, that's an error. You can either do a detail analysis at that point or you can simply reference the DC bounds your site parameters, and you're covered by that seismic margins analysis.

CHAIRMAN STETKAR: Okay. There you go with the bound to site parameters. That's the second item I have. It's my -- and here we go, technical stuff, so excuse me for awhile. In the design certification the applicant specifies a ground motion response spectra, GMRS, that they apply for the design of their structures and equipment that becomes the design-basis ground motion response spectra. It's a curve.

MR. HARRISON: Yes.

CHAIRMAN STETKAR: It plots ground acceleration G as a function of spectral frequency hertz. So it's a G versus hertz plot. And that's fine. That says we're going to design the stuff to meet this response spectrum. Great.

Now I come to a particular site and I do a site-specific seismic hazard analysis. And

for a variety of different hertz; 0.5 hertz, 1 hertz, couple of hertz, 10 hertz, 100 hertz, I develop seismic hazard curves that plot exceedance frequency in terms of events per year as a function of ground acceleration G with uncertainty. And they look like standard hazard curves. And in those hazard curves I have a mean curve and I have a set of those hazard curves, because the hazard looks different depending on the ground motion frequency hertz now.

And I believe that what applicants for the COL do is that they go in and they specify a design-basis exceedance frequency such that I am going to use a couple times 10 to the minus 4, or maybe 10 to the minus 5 for my design-basis exceedance frequency, go to each of their hazard curves, pick off the G level at 0.5 hertz that corresponds to the exceedance frequency of -- let's pick a number -- 10 to the minus 4. That becomes a point. That is their mean ground acceleration at 0.5 hertz at an exceedance frequency of 10 to the minus 4 per year. And they do that for each hertz and they plot now a ground motion response spectrum that has implicit in it an exceedance frequency.

In my example it would be that is the

ground motion response spectrum for an exceedance frequency of 10 to the minus 4 event per year. And they compare that then to the design certification ground motion response spectrum and say, look, our design-basis ground motion response spectra is below the certified design ground motion response spectra, therefore we're enveloped by that. But that doesn't mean that the design certification seismic hazard analysis has bounded my site-specific seismic hazard analysis because at the site I can have ground motions that are much, much larger than that design-basis ground motion at exceedance frequencies.

And the guidance is replete with these notions of the COL applicant will confirm -- will either do an analysis or confirm that the certified design hazard bounds the site-specific hazard. That comparison of two GMRSs that have implicit exceedance frequencies imbedded in them has nothing to do with bounding site-specific hazard in a sense of a risk assessment of seismic risk. Have I mis-characterized anything?

MR. HARRISON: It's relying on the deterministic design-basis. It's what's going to be documented in Chapter 2.

CHAIRMAN STETKAR: That is a curve. That says I design the building --

MR. HARRISON: Yes, it's more than just a curve. It's the site parameters. It's the Gs and the hertz and -- yes.

CHAIRMAN STETKAR: It's the Gs and the hertz.

MR. HARRISON: Yes.

CHAIRMAN STETKAR: That's all it is.

MR. HARRISON: And then the fragilities of the structures are in Chapter 3 using the same type of approach to come up with their HCLPFs.

CHAIRMAN STETKAR: We'll get to HCLPFs in a second. I want to keep on GMRS first.

MR. HARRISON: Okay. I should stop talking when --

(Simultaneous speaking)

CHAIRMAN STETKAR: That's all right.

(Simultaneous speaking)

CHAIRMAN STETKAR: I had three points --

MR. HARRISON: Okay.

CHAIRMAN STETKAR: -- and HCLPFs is the third.

MR. HARRISON: Okay. So those

parameters -- if a licensee -- if you get to a site, you're at COL and you show that my parameters are lower than or less than the parameters in Chapter 2 of the design cert, then what they're arguing is that your hazards analysis would be lower, but your seismic margins analysis, the PRA-based margins would be lower.

CHAIRMAN STETKAR: But, Donnie, at what frequency? Because I will show you sites where they can have ground motions at a particular hertz that are much, much higher than the ground motion response spectra specified in the DCD except that those ground motions occur at much lower annual exceedance frequencies. And rather than 10 to the minus 4 per year, it might be 10 to the minus 5, or it might be 10 to the minus 6, or it might be 10 to the minus 7 per year.

MR. HARRISON: Right.

CHAIRMAN STETKAR: So I could plot a 10 to the minus 7 curve ground motion response spectra that would clearly exceed the certified design ground motion response spectra.

MR. HARRISON: Correct. You'd have to expect that, right.

CHAIRMAN STETKAR: So my question is

that still -- that doesn't say anything about the certified design ground motion response spectra, which is a single curve, bounding the site-specific seismic hazard that I would use in a seismic PRA, because I would use the complete hazard in the PRA. If I want to get simple, I'll use peak ground acceleration. If I want to get complicated, I'll use the different hazard curves for each hertz now frequency --

MR. HARRISON: Yes.

CHAIRMAN STETKAR: -- and develop fragilities that correspond to those hertz. We use frequency too often and exceedance frequency and hertz. So the statements are -- I don't get it.

MR. HARRISON: Yes, and I guess the --

CHAIRMAN STETKAR: Because, see, if I read that, in a deterministic sense all it says to me is somebody comes in and says, well, I did my site-specific hazard analysis in Chapter 2. I have my hazard curves. I derived a mean -- at some implicit exceedance frequency a mean GMRS. I compared it with the deterministic GMRS in Chapter 2 of the DCD and I'm bounded. I don't need to do any more. I'm bounded. My hazard is bounded. My site-specific hazard is completed bounded in a PRA

sense -- because we're talking about PRA here -- is bounded. So I don't need to do anything.

MR. HARRISON: And I think that was the language that is either in the SRP or it's in the ISG-020. I can't remember. I think it's in the ISG-020 that makes these statements.

CHAIRMAN STETKAR: Well, I think you ought to --

MR. HARRISON: Yes, it's more of a deterministic approach to the seismic part --

(Simultaneous speaking)

CHAIRMAN STETKAR: But we're talking -- this is guidance for a PRA.

MR. HARRISON: Right. Yes.

CHAIRMAN STETKAR: This isn't a deterministic approach for design of a structure. This is guidance for a PRA.

MR. HARRISON: But that is what they're doing right now for the design certs and the COLs. It's a PRA-based seismic margins approach using that ISG. I hear what you're saying. I'm just saying that again one my ground rules was that I was starting with what existed and I wasn't going to go in and change the current guidance. So Capability Category I was already established.

Therefore that's what I focused on. ISG-020 is the established approach for DC/COL PRA-based seismic margins. That was the rules I played by. I understand what you're saying, that I can have a 10 to the minus -- I think it's 10 to the minus 5 that's in the SRP.

CHAIRMAN STETKAR: Is it 10 to the --

MR. HARRISON: It was.

CHAIRMAN STETKAR: I plotted them and some of them come out closer to 10 to the minus 5. Some of them have been in kind of the middle, like 3 or 4 times to the 10 minus 5 range.

MR. HARRISON: Okay.

CHAIRMAN STETKAR: If you look at the hazard plots and pluck off the mean, and sometimes you have to interpolate. So if there is something in the SRP that says 10 to the minus 5 --

MR. HARRISON: That's not in SRP-19. That's in the SRP on the performance-based design.

CHAIRMAN STETKAR: Oh, I only know what I plucked off -- I've reproduced the ground motion response spectra curves in Chapter 2 of the COL FSAR given the seismic hazard curves that they've given me. And at times it's been difficult for me to tell because it's interpolation many times on a

logarithmic scale that you can't read very well. That's why I said typically it's somewhere between about 10 to the minus 4 and 10 to the minus 5.

MR. HARRISON: Yes, and Hanh I don't --

CHAIRMAN STETKAR: But it does have --

(Simultaneous speaking)

MR. HARRISON: -- 10 to the minus 5? Do you recall what the performance-based seismic design criteria is? It's something 10 to the -- it may be 10 to the minus 6th even, but it's somewhere. We'll have to look that up.

CHAIRMAN STETKAR: It isn't 10 to the minus 6. It's 10 to the minus 5-ish on the --

MR. HARRISON: I just can't recall.

CHAIRMAN STETKAR: -- upper side of that. Anyway, just my own -- you've heard what I said anyway.

MR. HARRISON: Yes.

CHAIRMAN STETKAR: I don't need to belabor it any further.

And now we can get to the HCLPF. Here's another place where I kind of get confused when I read the clarifications -- the introduction that says seismic fragility analyses using the PRA-based seismic margins approach results in not

developing mean fragilities. HCLPF value is represented by capacity instead of a failure probability. Basic events will use HCLPF values to represent seismic fragilities. All of that is well and good if you're doing a seismic margins analysis, but there's a lot of -- the implicit part of this is because you only have HCLPF capacities which are -- HCLPF values, by the way -- for the record, HCLPF is H-C-L-P-F, and it's an acronym for high confidence of low probability of failure. It's a defined term which is a -- it's a nominal value that's derived from fragility assessment. And numerically it's the applied acceleration at which there's 95 percent confidence of less than 5 percent probability of failure. And as it works out, if you look at the mean fragility curve, it's the applied acceleration at which the mean probability of failure is about one percent. That's what it works out to be. So it's a value that's in fact derived from a fragility assessment.

To specify HCLPF capacity for a structure or a component, one has to have done some level of fragility assessment because the HCLPF capacity is derived from that. So to say that I only have a HCLPF capacity and I don't have a

fragility is not correct. You must have fragility assessment to derive HCLPF capacity.

MEMBER BLEY: In the original work when they defined this stuff -- you know the guys how did it --

CHAIRMAN STETKAR: I do.

MEMBER BLEY: -- they also argued that. And that's about equivalent to some exhortation of it which we know it won't fail.

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: So judgmentally they will sometimes generate a HCLPF based on I know it won't fail --

(Simultaneous speaking)

CHAIRMAN STETKAR: Well, no. And they also used it as a basis for truncating the hazard curve --

(Simultaneous speaking)

MEMBER BLEY: The hazard curve --

(Simultaneous speaking)

CHAIRMAN STETKAR: When they convoluted the hazard and the fragility, those high exceedance frequency, low-probability tails were getting -- causing problems.

MEMBER BLEY: The hazard curve flattens

out, is the problem.

CHAIRMAN STETKAR: Yes, as does the fragility curve. But here if I read the guidance with that knowledge, there's a lot in here that says, well, we can't do a fragility analysis because we don't have the information. But we have this HCLPF, so we can do a seismic margin assessment. My point is even if it's developed judgmentally, one needed to have some sort of fragility in mind to develop that. Now, the steepness of the fragility curve or the breadth of the fragility curve they might not have thought very much about, but given the design information, you have the structures designs, you have the equipment design. You don't necessarily have the as-built anchorage for equipment, nor the as-built pipe hangers, but you have design information for that. You can estimate a median capacity from that. And they are fairly standard values for uncertainty parameters; beta-R and beta-U, and that defines a mean fragility curve from which you derive a HCLPF capacity.

So the point is that part can be done at the DC stage because you don't need the site-specific hazard to do that. And in fact, at the DC

stage to do seismic margin analysis, if they're deriving the HCLPF capacities from that process, they've already done that.

MR. HARRISON: Right. It's somewhere in the supporting files that you'd have the information to --

CHAIRMAN STETKAR: Right.

MR. HARRISON: -- derive the mean.

CHAIRMAN STETKAR: The mean hazard. The mean fragility.

MR. HARRISON: The mean fragility curves.

CHAIRMAN STETKAR: If not even a family of fragility curves. So I mean, this is my opinion: I'd suggest you -- throughout all of the comments and the clarifications and comments, throughout the whole seismic section there are sort of those three issues. The first issue is it will be a seismic margin assessment. The second issue is that for reason my comparing GMRS curves we can assert that the design certification seismic hazard bounds the site-specific seismic hazard. And the third is the fact that, well, because we only have HCLPF capacities we can't do a seismic PRA because we don't have real fragility values.

And I just look at, well, if we have generic fragility values, it's not different than having generic --

MR. HARRISON: Data.

CHAIRMAN STETKAR: -- failure rate data for a pump.

MEMBER BLEY: I don't this fits in your guidance anywhere, but I want to say it because you might come across it. I don't remember where we saw this done, but somebody used the -- however these HCLPF were picked up to generate a fragility curve inside out and backwards. And the problem is usually if you say I'll be conservative and use a more broad distribution, usually that is conservative.

CHAIRMAN STETKAR: Measure uncertainty.

MEMBER BLEY: When you hook it at the bottom end and use a larger uncertainty, you're saying this won't break. It was settled through a lot of people that what they were doing was just completely backwards and nonsense.

CHAIRMAN STETKAR: If you anchor it at the median, then it is indeed conservative to assign larger uncertainty because in effect it spreads the bottom of the fragility curve to lower

accelerations. If you anchor at the HCLPF and assign large uncertainty, you're essentially saying there is less probability that something will fail as you increase acceleration. And you're right. And I know where I saw that, but I won't divulge that.

MR. HARRISON: Well, again, I guess the message I would take back is --

(Simultaneous speaking)

CHAIRMAN STETKAR: But look at those three issues that kept coming to me in the seismic area were those three: that there will be a seismic margin analysis even at the COL stage, that this notion of confirming that the DC hazard bounds the site-specific hazard, and the notion that --

MR. HARRISON: Discussion of HCLPF failures.

CHAIRMAN STETKAR: -- because I have HCLPF values I can do a seismic margin analysis, but I don't have an actual fragility that I could use for PRA-type analysis.

MR. HARRISON: Yes, and to be honest with you, that phrasing, I've worded it that way because I was thinking more of the min/max rule, and you're going to quantify to a plant-level HCLPF

as opposed to a --

CHAIRMAN STETKAR: As opposed to a seismic PRA. But see, this is another place where if you could do it at the COL stage; if you could do it, and I think you can, the poor guys who now inherit all of this stuff and have to now go from what they have at the COL stage to what they must have at fuel load are going to be a little bit surprised in this area, because there's a lot of work that needs to be done.

MEMBER BLEY: A lot of them think they already have it --

CHAIRMAN STETKAR: And a lot of them already think that they -- and they can point now to staff guidance that said, well, I confirmed that my site-specific hazard was bounded by the design certification hazard. And I followed all the staff guidance and did all my seismic margins analysis and this is all I need to do. It even says PRA-based, so I somehow did a PRA.

MR. HARRISON: Yes, and PRA-based means it's got fault trees.

CHAIRMAN STETKAR: Right.

MR. HARRISON: That's just a structural term, but not a real term.

MEMBER BLEY: A procedural issue, Madam Chairman, since you're laying out very detailed points here. No, this is an information meeting for us, as I understood it --

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: -- which we asked for.

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: And we're not at this point having a Full Committee meeting, although there's great temptation to --

(Laughter)

MEMBER BLEY: We're not speaking for the whole Committee, once again.

CHAIRMAN STETKAR: Right.

MEMBER BLEY: I just wanted to get that out here. But if we were writing letters, then some of these things would work their way into it, I would imagine, although I can't assure you that's true.

CHAIRMAN STETKAR: That's why I was careful to say "I' in most cases. And you're right. I mean, this is an information briefing and it's a Subcommittee meeting.

MS. MROWCA: Is this the first time that you've really looked at the concepts in the

ISG-020?

(Simultaneous speaking)

CHAIRMAN STETKAR: No, I looked at the concepts, and I don't remember when we looked -- we looked at that ISG some time ago in the Fukushima Subcommittee meeting. I can't remember. And I didn't look up my notes. We looked at that and I had several questions about the ISG, but if I was only going to do a PRA-based seismic margin analysis, I could convince myself that what's written in there is probably okay. I don't recall any tremendous heartaches with that very narrowly defined context.

But that goes back to if the staff basically recommends that through the COL stage you shall do only a PRA-based seismic margin analysis, then all of my whining about -- I would still whine very strongly about this notion of design certification hazard bounding the site-specific hazard, because there isn't a design certification. There is at a particular assumed exceedance frequency. It's an implicit -- it might be an explicit value, because I don't now where and everything to look for where numbers might be hidden. But if I think of guidance for doing risk

assessment, then a lot of the stuff in that EC ISG, whatever -- COL ISG-020 starts to fall apart because it's missing stuff.

MR. HARRISON: And I think that's the message. We need to go back and maybe take a look at the --

MS. MROWCA: And talk to our seismic friends.

MR. HARRISON: Yes. Since they're the owners of that ISG.

(Phone line tones)

CHAIRMAN STETKAR: That's troubling.

MEMBER BLEY: Since this is supposedly a closed meeting.

MR. NOURBAKHSH: It's closed.

CHAIRMAN STETKAR: Something's going on. Can you check whether indeed it's closed?

(Phone line tones)

PARTICIPANT: What is that? I never heard that little kind of beep.

MEMBER BLEY: Somebody perhaps calling in on a line that shouldn't be open.

MS. MROWCA: And I think part of the history of why we're looking at seismic margins is I believe that in the SECY it talks about that

acceptability, but I don't remember if it's addressing DC/COLs.

CHAIRMAN STETKAR: My recollection -- and I have to be very careful here because I don't know where everything is hidden. There are so many SECYs, there's so much --

MS. MROWCA: Yes.

CHAIRMAN STETKAR: -- been written on this stuff. My recollection was that there was an -- this is only my own recollection, that you could do a seismic margin analysis or a seismic PRA at the DC or COL stage. There was that option.

And then this ISG, DC/COL ISG-202, was written to further refine the staff's interpretation of what a seismic margin analysis is. Because the staff said you can't do the old EPRI 1980s version of a seismic margin analysis. You need to do the PRA-based seismic margin assessment that has, as Donnie characterizes it, basic events of a fault tree and actually quantify seismic and non-seismic failures through the whole model and develop, right, wrong or indifferent, a plant-level HCLPF. So that's my recollection for the evolution of that. Where all of that is located, I don't know.

And I don't know if -- Donnie, do you remember anything differently?

MR. HARRISON: No --

(Simultaneous speaking)

CHAIRMAN STETKAR: I recall it was an option. And then --

MR. HARRISON: And I don't remember that detail.

MS. MROWCA: I'll look it up.

MR. HARRISON: Yes, I don't remember the details of -- it wouldn't surprise me if --

(Simultaneous speaking)

CHAIRMAN STETKAR: But I do remember the discussion about the staff wanting more than just the old '80s version of EPRI seismic margin analysis.

MR. HARRISON: Right, that is correct.

CHAIRMAN STETKAR: And that was the fundamental reason for publishing that ISG-020.

MR. HARRISON: Right. There's the EPRI method, there's the NRC method and then there was the preferred method going forward as they used the PRA-based --

(Simultaneous speaking)

CHAIRMAN STETKAR: Yes.

MR. HARRISON: That was also the approach I think on the Fukushima response. It went down a similar path of saying don't do the EPRI approach.

CHAIRMAN STETKAR: Yes, and as I said, I think that the time that I looked at that ISG-020 was in the context of --

MR. HARRISON: It was.

CHAIRMAN STETKAR: -- Fukushima.

MR. HARRISON: Yes.

MS. DRUID: I mean, as far as I know, we have not endorsed Part 10 anywhere for any application.

MR. HARRISON: Part 10 was referenced by one of the Fukushima responses.

MR. HARRISON: Right.

MR. HARRISON: For pieces of it that you could do.

MS. DRUID: Yes, very narrow.

MR. HARRISON: You could uses pieces of it.

MS. DRUID: Very narrow.

MR. HARRISON: But that's as close to that Part 10 -- of any part of being endorsed was little pieces of it.

Okay. I'll go on. I thought this was the easy part of our presentation.

MEMBER SCHULTZ: It was.

MR. HARRISON: Once we get to the --

(Simultaneous speaking)

CHAIRMAN STETKAR: The seismic stuff I obviously got spun up on.

MR. HARRISON: No, and that's good.

CHAIRMAN STETKAR: It's going to get easier.

MR. HARRISON: That's good. And it just tells us that we need to go back and maybe re-look at ISG-020 again in this context.

Configuration control. Every licensee, every design cert has some type of PRA configuration control. This is a section within the standard. It's Section 1-5. And it has four or five elements basically. One of those elements talks about maintaining and upgrading the PRA so it's consistent with the as-built, as-operated plant. This section is just saying -- read that as the as-to-be-built, as-to-be-operated. So you still need to maintain your PRA, so it represents what you're going to build and what you're going to operate as best you know it at that time.

There's also a part of that configuration control process that talks about ensuring the cumulative impact of any pending changes is considered in the use of the PRA. And so, here we wrote that you should include guidance on when the PRA needs to be updated and upgraded, specifically guidance on addressing plant design conditions that differ from the current PRA model. So if someone makes a change in a system as part of their design effort, is it significant that needs to be made a PRA change immediately, or can you just track that for the next time you're going to upgrade the PRA model? So we're just making that clear that they should have that process already built in.

Peer review and self-assessments. This is kind of like a legal technicality type of thing, I would say. Again, the SRP-19.0 says that the design cert COL must justify the adequacy of their PRA. That's the scope, the level of detail, the technical acceptability of the model. You use the PRA standard for that.

However, if you look at the strict definition of what it means to be a "peer review," a DC or COL may not be able to fully meet that

definition. And we understand that you could still have an independent review. And there's some historical terminology; and Hanh's going to beat me up when I leave here because the terminology on peer review, independent review, self-assessment has been almost jargon. It's been intertwined and confusing for the last 15 years.

CHAIRMAN STETKAR: But we've had at least one applicant come in claiming that they did a peer review and satisfied Capability Category II using those words, when indeed they had done some sort of undocumented internal self-assessment. So sometimes the words --

(Simultaneous speaking)

MR. HARRISON: We've tried to make it clear in other arenas that a -- an internal -- every PRA gets developed and gets checked by the systems engineers and the plant designers. That's an internal review. Every systems analyst gets reviewed by another systems analyst. That's an internal second- checker review. Those don't count as peer reviews. And so you're supposed to be an outside entity. You're supposed to -- and again, some of the conditions they can't have is -- especially at the design certification stage they

may not have intimate knowledge of exactly everything about that design, especially if it's some new feature, but they should be -- if it's mostly a Westinghouse PWR but it's got some features, at least your independent reviewer should be able to have that expertise already down. And they just have to kind of be up to speed on the unique features of the advanced design.

But philosophically there might not be a precise definition of being able to say you're a full peer review because you don't know the ins and outs of the design exactly. You're only going to have a month or so before the peer review to actually get up to speed.

And another point we make in this part of the write-up is that the review team should document that limitation. If there are unique features like AP-1000 squib valves, and I'm the peer reviewer, I may know a lot about squib valves, but I may not know a whole lot about these big squib valves or when I look at the data for failures of he squib valves. So I should document that that's a limitation in my knowledge as a peer reviewer and then see if that affects any applications from it.

Operational guidance and practices. If the PRA standard -- and Mary yells at me about this. If the PRA standard was written without having nuclear power plants actually built, you wouldn't actually say or refer to your plant-specific procedures and practices. You'd use more generic terms. You'd say refer to your operating guidance documents. But the PRA was built with existing plants. And that was the philosophy, right, Mary, that the current plants were the basis for the PRA standard and the knowledge that we used.

And so, the guidance occasionally sometimes makes specific reference to plant-specific procedures, plant-specific practices, plant-specific alignments of systems. At the DC/COL stage you're not going to have those plant-specific procedures or established specific operating practices, but you should have guidance on how you think you're going to run the plant and how you're going to operate things and how the alignment in the design is set up. And then there's typical good practices. And whatever you do there, you need to document those assumptions.

And there again, potential impacts on

PRA uses. A classic one would be how are you going to -- if you have a three-train system where two trains are running and one is in standby, there's two basic philosophies: One is you keep one in standby forever and it's only there when you need it to do testing or maintenance on one of the first two trains. That's one approach to running a plant. Another approach is I'm going to alternate my systems so they get similar operating experience over time.

Those two operating philosophies need -- one of them needs to be picked as the way you think you're really going to actually build and operate the plant. When you get to COL, you may actually say, no, we're going to do the other one. When you get to operations, then you'll actually figure out what you're going to do. I've been at a plant that actually changed strategies on their operation of a system by they time the were in design, construction and into operations. So they actually flipped back and forth. So that can happen.

But again, the point here is document what you're going to do, read the supporting requirement as the operating guidance that you have

available at the you're at, document the assumptions you have to make in that, and move on.

Large release frequency.

CHAIRMAN STETKAR: On that previous slide -- it's peripheral, but I didn't find any other place to whine about this one. The stuff on this slide I think makes a lot of sense. One thing that bothered me; and it's kind of scattered, you have to read the individual comments, was the -- as part of operational guidance and practices I also include experienced operators. And a read -- I'll point you to three places, and there are probably more you can note. HR-E3, HR-E4, HEA-A4. Those are less important than the basic notion.

And to get a notion of my concern is HR-E3 for Capability Category I, "Review the interpretation of the procedures for the plant operations or training personnel to confirm that interpretation is consistent with plant operational and training practice." Capability Categories II and III. This is one place where it spans II and III. For those requirements it says, "Talk through; i.e., review in detail with plant operations and training personnel the procedures and sequence of events to confirm that

interpretation of the procedures is consistent with plant observations and training procedures." These are in particular the interface between human performance and the event sequence models.

In the staff's clarifications and comments on this particular requirement it says, "Plant operators and training practices will likely not be available to perform this review. As such, the supporting requirement is not feasible in these application stages." That to me says, well, I don't have a licensed operator that has actually operated an AP-1000 for four or five, so I don't need to talk to anybody with operations experience.

You said something about five minutes ago that struck a chord and you said, well, you know, to me an AP-1000 looks an awful lot like a Westinghouse plant except it's got different ways of getting water into things. Westinghouse has guidance for emergency operating procedures. I wouldn't expect them to write diametrically opposed guidance for an AP-1000. Even a US-APWR and EPR looks an awful lot to me like a large pressurized water reactor. Why

don't I have that resource? Why shouldn't I use that resource of experienced

operations personnel for, example, development of the event scenarios, for example development of the HRA, for example evaluation of operator performance in response to fires or seismic or floods, or any of those other things where you say it's just not feasible?

This again is part of this kind of very compartmentalized thought process of I do not meet every single dotted I and cross T of my interpretation of this particular supporting requirement and therefore it's not feasible rather than backing off. In many cases you do back off and have a much broader perspective, like plant-specific versus generic data. In some cases you get very, very focused and say, well, it's not feasible. You can't not -- not only should you try to do something else, but you just can't do anything.

MR. HARRISON: Yes, and I think what you're pointing out is on an item like this you might be able to say you cannot meet the exact words here, but you could do something.

(Simultaneous speaking)

CHAIRMAN STETKAR: And in many cases you say that.

MR. HARRISON: Yes. And this is an example of probably my own -- I got my optic, or whatever -- I got so focused in on not having the training personnel because I was looking at it as asking someone to interpret a procedure that doesn't exist --

CHAIRMAN STETKAR: That's true.

MR. HARRISON: -- by people who haven't done the training on it, because it doesn't exist. So I got my logic into this. You could have said everything I had in my comment and then said, however, the staff -- well, I can't use --

(Simultaneous speaking)

CHAIRMAN STETKAR: Expects the --

MR. HARRISON: However, you should do X, Y and Z. Right. You should have knowledgeable personnel review the operating guidance that you have to see if you're --

(Simultaneous speaking)

CHAIRMAN STETKAR: Event scenarios and to see whether it's contrary to what experienced operators, at least today, would do. Say, well, hell, we'd never do that because EOPs tell us we shouldn't do it. That at least challenges it, because then the designers can come in and say, oh,

we have a different philosophy in our EOPs or something.

MEMBER SCHULTZ: And one, it will help the operational personnel who were involved in the design and would have some thoughts associated with what the expectations are for operator practice.

CHAIRMAN STETKAR: Yes, one would hope.

MR. HARRISON: And some of this --

MEMBER SCHULTZ: I understand.

MR. HARRISON: And this may be a good example where I missed something on it because I was

-- the industry when they developed their draft standard was looking at a -- they were replacing this with go talk to the designers.

CHAIRMAN STETKAR: But that's --

MR. HARRISON: And my comment to them was you should have already done that before you got to this point in the PRA. This is a check to make sure that you're HRA analysis is consistent with the way you believe the plant is going to operate. You already talked to the designers to get to this point. So they're just going to tell you what they already wrote in the FSAR. What this is looking at is what do the training people and

the people with operations knowledge actually tell you. So I responded by saying no to this because I was thinking of that answer. I wasn't thinking of what's the alternative that you probably should do?

So you're catching a good comment on maybe walking back through these afresh.

CHAIRMAN STETKAR: Well, I think that's -- let's start at the beginning saying you've gone through every single one of these things. And I didn't. I mean, I did, but I did it with a different perspective. I went through them and looked at every place that you said either cannot or not applicable or there was a caveat over in the third --

MR. HARRISON: Right.

CHAIRMAN STETKAR: -- over in your comments and said --

MR. HARRISON: Exactly.

CHAIRMAN STETKAR: -- is there something here?

MR. HARRISON: Yes, and so if I went back through that column, the clarification column and said every time I'd have a cannot meet or a not applicable, did I give a clarification of what do I want you to do? And if not, then --

CHAIRMAN STETKAR: Yes, and sometimes, I'd say in the vast majority cases --

MR. HARRISON: Often I try to do that.

CHAIRMAN STETKAR: -- if you did that comparison, it was there.

MR. HARRISON: Yes, this was a handful -- well, probably more than a handful. There are a number of these where I just say it's not feasible.

CHAIRMAN STETKAR: There weren't too many that -- well, there were, but in many of those cases you could read the stuff and say, well, yes, you're right, it's not feasible.

MR. HARRISON: Yes. No, that's a good comment. I think I'm taking away more homework assignments.

MEMBER SCHULTZ: And in the other areas there were things that were or could be considered grouped together with the same logic that John's describing could be set up in that different way.

MR. HARRISON: Yes.

MEMBER SCHULTZ: In other words, you don't have to treat each one separately and different. In certain of these areas there is common treatment that you would use to ensure they focused -- to dig the right information out when

they could.

MR. HARRISON: Right. And partly that's why when we get to what I call the technical challenges we have like a roll-up table. But basically everywhere I have a "not applicable," a "cannot meet" or a "replace," that supporting requirement should have shown up in that table under one of these technical topics. That was my way of trying to keep track of -- and I actually this morning caught that I have at least one -- two SRs in two places, because I think we changed our mind of, well, which group it went in and I didn't correct the table to get that out of there. But that was my way of tracking, that when I got done did I -- I can look at those technical topics and groupings and say is it all there? Did I miss anything?

But, no, it's looking at it a fresh time. By the time you get to Part 9 of this, your brain is pretty much dead and you're starting to make different decisions than you did in part 3. That was --

CHAIRMAN STETKAR: What a surprise.

MR. HARRISON: Some of the major part of the summer, to be quite honest with you, was

rectifying the answers we made in March and then looking at what we did in May and saying, wait, the same basic topic is in two different parts and we're giving it different answers.

CHAIRMAN STETKAR: And that's one of the benefits. As I said, when I read through this I didn't have the time to read every single one, so I sort of developed -- but I did it over a couple-a-day period so that I didn't have that long timeline of perhaps losing the thread.

MR. HARRISON: Right. Well, the joke at least I made to the staff is I got sick for about three days and actually did a whole bunch of this while I was sick, because I was stuck at home. So I might as well just sit down and start marking things up. So that was actually helpful.

Okay. We'll move on. Large release frequency. The PRA standard uses large early release frequency because that's the risk metric that's in the current fleet for how they do risk-informed decisions, risk-informed applications. Design certs and COLs address large release frequency. And the note we make is from a what to do. Containment performance is containment performance. Separating large early release from

large release is I'd say more probably a political decision than it is a technical one going through the standard requirements. So you can just walk through the standard at the high level and the supporting requirements and just everywhere it uses LERF just replace it with LRF and you'd probably get pretty much the same result. So that was that decision.

CHAIRMAN STETKAR: Is this a good place to stop, Don?

MR. HARRISON: Yes, we can take a -- this is transitioning to the next topic.

CHAIRMAN STETKAR: Yes, this is --

MEMBER BLEY: Before you go --

CHAIRMAN STETKAR: Dr. Bley, yes?

MEMBER BLEY: Just one quick comment, back to my old favorite topic about the passive stuff. I took a look back through the standard. Actually there are words tucked away in the standard; not so many, in about six places, that tell people to be careful to consider passive failures and the things that could cause them. And where it tells you cannot do -- you can exempt certain things, it doesn't let you exempt them. So the standard is not enough to catch it. Point one,

nobody's doing it.

Point two, no reviews are catching it. I think in your guidance to the staff it's important to raise that issue. Enough said.

MEMBER SCHULTZ: Hear, hear.

MR. HARRISON: It should be caught.

(Simultaneous speaking)

MEMBER SCHULTZ: It only will be caught if it's brought out clearly.

MEMBER BLEY: Because they're not doing it now, so whatever is in the standard about it isn't getting their attention.

MEMBER SCHULTZ: And there are words that would suggest that it's supposed to be handled in again what I described earlier, the uncertainty evaluation. Somebody could go after it there, but there's not enough --

MEMBER BLEY: That's at a high level.

MEMBER SCHULTZ: -- it's at a high level so there's not enough there to require --

(Simultaneous speaking)

MEMBER BLEY: There's even specific things. Specifically look for things that could plug passive components, cause leakage in them, rupture them or affect other things. And that's

common across all three categories and there's no exemptions for that.

MEMBER SCHULTZ: That's right.

MR. HARRISON: And I would think what makes --

MEMBER BLEY: And there shouldn't be.

MR. HARRISON: The example that John had about the spurious operation, there is within the data area where if you that something is multiple orders of magnitude lower than a critical -- another failure of that same component, you can screen it out. However, that's with the premise that it's serving the same function or has the same consequence. If you're screening out a valve spuriously opening versus failure to open, those are two different functions being achieved and consequences achieved. So you shouldn't screen out the spurious because of that. So that would be an error by the applicant and error by the staff if it got missed.

CHAIRMAN STETKAR: Donnie, I just did --

(Simultaneous speaking)

CHAIRMAN STETKAR: You made me do a word search and now I'm confused. We're going to

take a break. And this is just supporting requirement SC-B5. In the standard it indeed addresses -- says "for defining success criteria for safety functions performed via passive means; i.e., relying on natural physical processes such as natural convection, thermal conduction, radiation, etcetera, use mechanistic models supported by empirical data and characterize uncertainties and the capabilities of the applied models and input data in the demonstration that success criteria had been adequately fulfilled in the calculation of passive functional reliability." So all three categories.

MR. HARRISON: Restate what that requirement is.

CHAIRMAN STETKAR: S, Sam; C, Charlie; B, boy; 5.

MR. HARRISON: Yes, that's not the way he said that.

CHAIRMAN STETKAR: Huh?

MEMBER BALLINGER: I didn't read that.

MEMBER BLEY: Unless we got an old version of the standard and they watered it down, which seems to happen.

CHAIRMAN STETKAR: Oh, I'm sorry. Wait

a minute. I'm probably confused.

MEMBER BLEY: I think it's probably time for a break.

CHAIRMAN STETKAR: It's time for a break, because I pulled up the wrong standard. I'm sorry. That's in SC-B5 for the non-LWR.

(Simultaneous speaking)

PARTICIPANT: Non-LWR?

CHAIRMAN STETKAR: That's for the non-LWR.

MEMBER BLEY: But the stuff I read is in the --

CHAIRMAN STETKAR: It's in the LWR. I had the wrong standard open because I clicked on the wrong file.

(Simultaneous speaking)

CHAIRMAN STETKAR: Those are good words.

(Simultaneous speaking)

CHAIRMAN STETKAR: It's SC-B5 is, yes, earlier.

MEMBER REMPE: SYA-11 has something that I think would be relevant, but we could go through this a lot and --

MEMBER BLEY: Are we on a break.

CHAIRMAN STETKAR: Not quite yet. We'll get there. The problem is a lot of the system stuff talks about passive failures like manual valve transfer and close.

MEMBER BLEY: Well, the ones I read aren't --

MR. HARRISON: Yes, that's similar to the --

CHAIRMAN STETKAR: Anyway, let's --

MEMBER BLEY: Active or passive failures is quoted in there a number of times.

CHAIRMAN STETKAR: Unless somebody has something really important or, like me, something totally wrong --

(Laughter)

CHAIRMAN STETKAR: -- we'll take a break until 3:25.

(Whereupon, the above-entitled matter went off the record at 3:05 p.m. and resumed at 3:24 p.m.)

CHAIRMAN STETKAR: All right. We're back on the record.

MR. HARRISON: Okay. We'll move into the SR-by-SR evaluation process. So this is the long table. That's the tables in the back, 70

pages of tables. And then we'll come back to the grouping and the technical challenges.

So the overall approach was basically first to go through the SRs and look for two things: One is is it applicable to the design cert or COL stage? Ninety-nine percent, ninety-eight percent of the standards are going to be applicable. There were things we saw in there that we thought should not be applied at the design cert stage, and actually some of those are being fed into the standard not to be applied in the current standard, much like my do nothing for trending analysis that's in the generic reference.

Once you went through that, at the same time you look -- if it is applicable, then is it feasible to meet that requirement as it's written in the standard at Capability Category I for a design cert or a COL at the application stage? And sometimes it's like do I need to clarify things? Like the plant procedures you can just say plant operational guidance for that. Can I clarify it to make it so that you can meet it? And so that was the philosophy behind how we went SR-by-SR.

We ended up with six potential capability outcomes with subtle differences, and

we're going to walk through examples of each of these, or most of these. You can meet the requirement. It's feasible to meet it straight up. You can meet it possibly with some type of clarification. Sometimes you cannot meet the requirement. And that's all we say, you cannot meet it. It's kind of the cannot meet, it's not feasible, don't do anything. Sometimes we provide clarification of what you should do, what you should perform instead of that requirement even though you can't meet it.

There's places where we have that it's not applicable and we basically say the supporting requirement is not appropriate for use by an advanced light water reactor or it's conditioned on another SR that you're not going to do. So it's a conditional. This is not applicable because you can't do this other thing anyway that it references. Sometimes it's not applicable and there's again clarification that says what you should do instead.

There's a handful of the places where we replace the requirement with a new requirement. Most of this is in the screening area. So I put one of the more significant changes in as the

example of this so we can walk through that significant change.

So we're saying that the SR is not appropriate for use by an ALWR, but you should do something else, and typically it's a little more detailed. There are other place where there's something missing and we're just enhancing the supporting requirement to add on. Most of this is in documentation. Again, the limitation is due to the design.

And then sometimes, especially in the fire Part 4 section, they didn't arrange their documentation requirements the same as the rest of the standard and so they don't have in a number of places documentation requirements that other places would have had . So we had to provide new requirements, new supporting requirements for them to document their limitations for applications.

CHAIRMAN STETKAR: Do you have any examples from fire?

MR. HARRISON: Yes, I do have --

(Simultaneous speaking)

CHAIRMAN STETKAR: You do? Okay. Go on.

MR. HARRISON: I think I do.

CHAIRMAN STETKAR: Keep going. If there isn't, I'll come back to at the end.

MR. HARRISON: Okay.

CHAIRMAN STETKAR: So we'll just keep plowing through.

MR. HARRISON: Okay. So we'll go through the first one. Again, I'm going to walk through these bullets. This is a you can meet it. There's no clarification needed. Straightforward reading of the SR is applicable and feasible to the design cert applicant. And the example here is AS-A6. Where it says "Where practical, sequentially order the events representing the response of the systems and operator actions according to the timing of the event as it occurs ... " This is just developing an event tree, and when you develop your event tree, make sure -- try to put things in time sequence. There's nothing that needs to be clarified about that for someone to go off and do it. All right. So you can just straight up -- that will be a can meet. These are the easy ones.

Here's an example where there's a can meet and there needs to be some clarification. This is Initiating Event A5. It says, "Perform a systematic evaluation of each system, including

support systems, to assess the possibility of an initiating event occurring due to a failure of the system." So this would be like the special support system initiators. The clarification we made on this was regarding some parts of the design you may have to make an assumption about the arrangement of that support system. In particular, a typical one is a loss of service water as an initiating event. At the design stage you don't know if you're on a lake, if you're having cooling towers, if you're going to be on a river, some type of impoundment pond or whatever, so you may have to make an assumption about what you're service water system actually looks like at that intake structure, and then you can model loss of service water based on that assumption. And again, it's a limited area, so that's why it's a clarification. We can say you can meet it just by documenting those design assumptions.

Here's an example of a cannot meet and there's no clarification provided. We're saying it's not feasible and no action is needed to be performed. And the example comes out of Internal Flooding QU-A11 where it says, "Conduct walkdown(s) to verify the accuracy of information obtained from

plant information sources and to obtain or verify inputs to engineering analysis, HRA and everything else.

Since at design cert and even COL you haven't built anything, it's going to be hard to do a walkdown. And people in the industry have talked about why can't you have a talk-through with operations staff? And the reason why we're saying you cannot meet this and there's no action is because a talk-through with the designer is just going to tell you what he expects to get built.

A walkdown of the plant actually verifies that what he told you is actually what got built. So you're supposed to have already talked to the designers to build your model. This is to verify that they actually built what they told you they were going to build. And then also you'll find like in seismic the anchorage issues and all that stuff come out.

CHAIRMAN STETKAR: This is one of the areas that I thought about quite a bit, and I kind of convinced myself that the guidance seems to be okay because you defined the compartment; whatever you want to call them, areas, compartments, based on the design information. And so you should

capture all of that. There's going to be a wall here and it's going to be a water-tight door, or whatever is design information. So theoretically doing those talk-throughs, you're right, you're only going to -- well, I told you there was going to be a wall there and there's going to be a water-tight door there.

MR. HARRISON: It's just going to verify what he told you, what he should have told you months ago when you first built that system. Right. And again, the walkdown says is the door actually a water-tight door or not? That's when you find out. Yes. So this is an example where we wouldn't have provided a clarification.

Here's one where you cannot meet it but we said we gave a clarification. This is in the fire area where it says --

CHAIRMAN STETKAR: This is the one I was going to ask about, so --

MR. HARRISON: Ooh, okay.

CHAIRMAN STETKAR: -- yay. That's good.

MS. DRUID: Can we just go back to the previous one for a second? I just want to clarify.

MR. HARRISON: Okay.

MS. DRUID: Because they can't meet this; and this is a legitimate one, it doesn't mean they don't meet the standard.

MR. HARRISON: Oh, right. Yes, good point, Mary. Most of the requirements, when you address a supporting requirement or a high-level requirement, it's the preponderance of the evidence. So if I find an error in a system model, but it's just a single error, that doesn't mean they don't meet the supporting system requirement. They still meet the system supporting requirement. Just because I don't meet a supporting requirement doesn't mean my PRA fails that entire area of the analysis. So you can still have an adequate technically good PRA and not have pieces of the PRA met.

MS. DRUID: Right, but this one's a little different --

MR. HARRISON: It's subtle.

MS. DRUID: -- because it's just not feasible. So in essence we're saying this is not an applicable requirement that you need to meet.

MR. HARRISON: Right. You cannot meet it, we recognize you can't meet and you don't have to meet it for the design cert and COL. The

expectation though is that by the fuel load they're going to have to come back and meet it. And that gets you into the Configuration Control Program if they find something.

Okay. Cannot meet with a clarification. So the SR is not feasible, but we believe there's something that should be performed. So this says, "Identify the fire safe shutdown/Appendix R equipment to be credited in the fire PRA." We recognize that at design cert they may not have identified their fire safe shutdown equipment or their Appendix R equipment, so you don't have that information. So you can't meet it. But you can get a lot of that information or the equipment list created based upon looking at other things like your internal events PRA in the mitigated systems.

CHAIRMAN STETKAR: Donnie, in the context of a PRA, I read the standard and I guess I know some of the history of the standard, but I'm really confounded by what the relevance of a safe shutdown/Appendix R equipment list has to a PRA anyway? That's a stylized list of things.

MR. HARRISON: It's a source of information, but, yes, I would --

CHAIRMAN STETKAR: It's a stylized list of things?

MR. HARRISON: Yes.

CHAIRMAN STETKAR: I have all of the stuff theoretically in my PRA model that should prevent the core from melting, whether it's Appendix R or whether it's safe shutdown or whether it's safety-related or it's non-safety-related. Some of it burns; some of it doesn't burn. The stuff that doesn't burn can fail, or it can work. So I don't understand why we're focusing on -- other than the fact that the standard anally focuses on Appendix R safe shut down stuff, why in the context of this guidance we're paying attention. It's irrelevant.

MR. HARRISON: Correct.

CHAIRMAN STETKAR: Okay. But this says, well, you can't meet it because you don't have that, but you can identify in addition to this source, such as equipment -- it's irrelevant. You have the equipment in the PRA.

MR. HARRISON: And if you look at the ES-B that I've got up here, again at this point this is the equipment selection part of the fire PRA, so they're going off and they're collecting

all the equipment that should be put in the PRA.

CHAIRMAN STETKAR: But see that was written by somebody who never did a fire -- or they were thinking in the context of I have like 300 PRAs. I have a fire PRA, and I have a seismic PRA, and I have an internal flood PRA, and I have an external flood PRA, and I have an aircraft crash PRA, and I have an internal events PRA, and I have a turbine missile -- and if somebody who is a fire analyst thinks a fire PRA and he's spent his life doing deterministic Appendix analyses, of course he'd write something like this.

MEMBER SCHULTZ: It goes on the list and becomes an artifact.

CHAIRMAN STETKAR: Yes, it's an artifact. It's a complete artifact. And why doesn't the staff in the guidance just simply acknowledge that, that the Appendix R list may or may not exist? Maybe the design certification has defined an Appendix R list in the same sense that there have been staff RAIs at the design certification to provide a list of minimally required instrumentation to support safe shutdown. And there's been kickback from applicants saying we can't define that yet because we haven't done our

human factors engineering assessment, yada, yada, yada. So we cannot specify in our design certification that list of instrumentation. In principle they could define this at the design certification stage. or certainly at the COL stage they could define it. They've tended to not do that. But the whole point is why is it relevant at all?

MR. HARRISON: I would agree. This is an artifact of the fact that the standard itself was derived after the people had built fire PRAs, and people have used that list as a starting point to get some of the information that says, yes, this needs to be in the PRA or modeled in the PRA. Now I've got to model a whole bunch of other stuff, too, so I'm going to bring that stuff in. You don't necessarily have to go down this path to get the list, right.

MEMBER SCHULTZ: It's a convenient compilation of information for the fire PRA evaluation, but --

MR. HARRISON: Yes, but --

(Simultaneous speaking)

CHAIRMAN STETKAR: But in some senses it's a stylized compilation of information because

it can be different. Taking that list and using only that list of equipment in a fire PRA can give you results from that fire PRA that are different from your internal events PRA because you have different sets of equipment and different functions. The full power internal events PRA might have taken credit, for example, for secondary heat removal to the main condenser through the steam dumps. The stylized fire PRA, because it was developed for Appendix R, can't take credit for that stuff because it's non-safety-related.

MEMBER BLEY? Do you think referring to it here tells people that that's all they need to look at?

MR. HARRISON: That's not the intent.

MEMBER BLEY: I know.

MR. HARRISON: If you look at the --

MEMBER BLEY: I'm asking --

MR. HARRISON: Yes, okay. I'm sorry. You weren't asking me. You were asking John? Okay.

MEMBER BLEY: No, I'm asking John. I didn't think that was your intent. I'm not sure I got it as your intent. But you're afraid that will be the result, Mr. Stetkar?

CHAIRMAN STETKAR: I'm afraid that the focus on whether or not you have an Appendix R equipment list might de-focus people away from putting fires into the PRA.

MR. HARRISON: And I guess in that context if you go to ES-B3 where it also uses fire safe shutdown and Appendix R, it also has include additional equipment if the equipment is associated with new initiating events or different accident sequences that --

(Simultaneous speaking)

CHAIRMAN STETKAR: But see that's again -- you now have gone -- this reinforces the notion of having an approved minimum set of stuff in your PRA; it's not analogous to this Capability Category II, and sort of voluntarily adding other stuff in as you think it might be necessary, where this Appendix R safe shutdown list is a completely derived licensing artifact for completely different purposes.

MR. HARRISON: Right.

CHAIRMAN STETKAR: It's defined for a Deterministic Fire Protection Program where you want to protect this pump because you've designated it as my safe shutdown pump. That pump has a right

to fail in the PRA, and some other equipment might be modeled. It was the one place in the fire analysis where my concern is because to date none of the applicants that we've seen for design certification or COL have taken a risk-informed approach.

They're all using Reg Guide 1189, which is the Deterministic Fire Protection Program and they'll have a safe shutdown equipment list. And they'll say, well, we satisfied everything. All we have to do is do this. We don't need to do anything more in the PRA.

MEMBER BLEY: To me, we've got something akin to what we had earlier talking about going to the FSAR to get a preliminary idea of the P&IDs and of the equipment important to safety and all of that stuff. Maybe it's just you need some language. It seems very reasonable to me to raise this as something to look at, but within the context of that's just the first place to begin to gather information. But otherwise, we'd go back and get rid of all the stuff about Chapter 15 and --

(Simultaneous speaking)

MS. DRUID: Just to defend Donnie a

little bit here --

MEMBER BLEY: I'm sorry?

MS. DRUID: Just to defend Donnie a little bit here, in trying to not cause too much upset-ness with the Standards people we had one ground rule that when we were doing this we weren't going to go and change requirements in the PRA. So I have to tell you every time I read that PRA, I find something and say, oh, my gosh, why didn't we catch this? And I think that's true of any standard. You're always going to find things. Gosh, this could have been written a lot better. And this is an excellent discussion because it's going on my list because we are trying to do a whole new revamp of the standard in the next edition. But a lot of these things you may find, and we thank you for finding them.

CHAIRMAN STETKAR: I get it. A little bit of the concern is now I'm very sensitive. We're going to have a meeting at the end of the week, Thursday, on NFPA-805 where we've had a lot of concerns come back from the industry saying this is excessively conservative, it's not realistic, the staff has boxed into a corner where we're forced to do excessively conservative analyses.

One way to do an excessively conservative analysis is to say that the only thing that I'm going to put in my PRA is my Appendix R list of equipment, because I'm not going to put any of the other stuff in there, which for Capability Category I is the implication, if you had that list.

MS. DRUID: Industry likes to whine about a lot of these things. My feedback on that is industry helped write this standard

CHAIRMAN STETKAR: No, no, no. We'll have this discussion on Thursday.

MS. DRUID: And they have not objected to --

(Simultaneous speaking)

CHAIRMAN STETKAR: No, we'll have that discussion on Thursday --

MS. DRUID: Yes --

(Simultaneous speaking)

CHAIRMAN STETKAR: -- when industry is here. But a little bit from my perspective kind of reading through these things is -- this one I didn't feel real strongly about, but it was the one area that I flagged kind of in the fire analysis.

MR. HARRISON: Yes, and we could have added a clarification. And you're going to see it

on the screening of hazards where I have language that says not only is it not applicable, but should not be used. Not only no, but no. We could have said you don't need a fire safe shutdown Appendix R list to start from. You could start and create your own for your PRA that what's needed.

CHAIRMAN STETKAR: They already have it. It's in the PRA.

MR. HARRISON: It's in the internal events. And then you may have to look for it in the spurious failures and stuff. So, yes, you don't need to do it this way. This is a legacy from the current standard. And again, our point on the clarification is you can get this mitigated equipment identified through your internal events and other --

(Simultaneous speaking)

MEMBER SCHULTZ: That's right. And that's what you're saying.

MR. HARRISON: And that's what we're saying. But I think your point is we could have made a stronger point with this clarification that says this is not necessary. Again that gets back to --

(Simultaneous speaking)

CHAIRMAN STETKAR: But that gets to -- yes, that's -- and I understand.

MR. HARRISON: I was told not to attack the standard.

CHAIRMAN STETKAR: I understand some of that.

MR. HARRISON: If I can say it that way. Except in the hazards. I can attack the hazards part.

So here's an example of something that's not applicable. And this is my example: Not appropriate for use. Internal flooding has a screening criteria that allows you to screen out an area. If it has one of these conditions below and it includes the flood area contains flooding mitigation systems, drains and sump pumps capable of preventing unacceptable flood levels and the nature of the flood does not cause the equipment failure.

My comment on this is why it's not applicable and should not be used is that drains can be plugged and have been covered in the past. Sump pumps can fail. This should not be used as a qualitative way of screening out area flooding. You should quantify instead of qualitatively saying

just because I have a sump pump doesn't mean it always works. But that's implicit. There's an implicit crediting of performance of a pump or a drain when it should be modeled as a potential failure mode. So that's an example where we say not only don't do it, but -- or not only is it not applicable, but don't even try to use it.

Okay. Here's a not applicable where there's a clarification. This one, actually it took me awhile to find it because this only shows up in like a couple of places. And this is a strange one. This is out of fires, I believe, too. It says, "Verify the peer review exceptions and deficiencies for the internal events PRA are dispositioned and the disposition does not adversely affect the development of the fire PRA plant response model."

So this is go off and check their peer review of the internal events to make sure -- see if it impacts you. Here we said this is not really applicable to go off and check another peer review to see how it affects this application. However, you can take the findings and insights from the internal independent reviews and review them to make sure your fire PRA is consistent with your

internal events PRA. That's the intent there.

CHAIRMAN STETKAR: Donnie, one thing, and this is sort of generic, and I noted this one and there were a couple other places where it talks about review. For Capability Category I; and correct me if I'm wrong, it basically says I don't need a peer review. Because I'm not familiar with the standard, does the standard say I need any kind of review?

MR. HARRISON: There's a general section in the standard about peer reviews, and then each section has --

(Simultaneous speaking)

CHAIRMAN STETKAR: But not a peer review, because a peer review, according to the standard, is a defined thing.

MR. HARRISON: Right. The internal review process is not defined in the standard.

CHAIRMAN STETKAR: Is not defined? Okay.

MR. HARRISON: That I recall.

MEMBER BLEY: But a couple of places has something on QA?

MR. HARRISON: No.

MEMBER BLEY: No? Well, it went away.

There was something at one time.

MS. DRUID: No, there never --

MEMBER BLEY: Never was?

CHAIRMAN STETKAR: A couple of places. This was one, and there is another one that because of the time I'm not going to try to find. There was almost an implicit incentive for somebody to not do a review because if they did a review, the guidance says, well -- the guidance now to the staff says go look at that review and, my God, if they found anything, go beat up the applicant.

MR. HARRISON: Yes, that's why my earlier --

(Simultaneous speaking)

CHAIRMAN STETKAR: And so therefore why in the heck would I do a review, because I don't benefit from it for the staff. I didn't do a review. I wasn't required to do a review. And the only benefit of doing a review is to get beat up by the staff.

MR. HARRISON: Yes, there's language in SRP-19.0 that says you're not required to have a peer review. And if one is done, the staff should review it.

CHAIRMAN STETKAR: Yes.

MR. HARRISON: -- and make sure it's adequate. That being -- and that's where my slide on peer review kind of flipped that around, which is regardless of what you did, you have to show that your PRA is adequate, technically acceptable scope, quality.

CHAIRMAN STETKAR: But is that -- and that's why I was --

MR. HARRISON: And one way of doing that would be to do an independent review. If you don't do an independent review, you'll probably get questions on how did you establish the quality, the technical acceptability of your PRA? So I flipped that argument around. It's written the way you're saying it in the SRP. My original write-up in my write-up was regurgitating that. And when I talked to the staff, we decided to flip that around and say, no, you always have to say your analysis is acceptable for its use. One way is to do a peer review or an independent review. And if you did that, then the staff is going to review it. Implicit in that is if you don't do that, then you're probably going to get questions on, well, how did you establish the quality of your PRA?

CHAIRMAN STETKAR: I haven't seen those

questions to date, but go on.

MR. HARRISON: But we did flip that around.

CHAIRMAN STETKAR: In design reviews.

MR. HARRISON: So that would be the intent. If someone came in and said we didn't do an independent review, then they should have somewhere where they justify why they believe they've done a good job with the application.

CHAIRMAN STETKAR: Yes, we asked one of the applicants how they justified that they'd done a peer review to meet Capability Category II, but I don't recall the staff asking. Go on.

MR. HARRISON: It's in the SRP now.

Here's something that's not applicable and it's not applicable because it's conditioned on something else that's not done. So the ignition -- again I stayed in fires for some reason for the not applicables. For fire ignition A6 it says, "When combining the evidence from generic and plant-specific data use a Bayesian update process. Justify the selection of a prior" -- well, if I'm just using generic, I don't need a Bayesian process, so all the requirements that this ties to wouldn't be done.

All right. So this assumes you are going to have plant-specific data that you'd have to update.

Okay. Here's the big area where we actually get a fairly significant -- in my mind a significant change is under the category of something that needs to be replaced. So we say the SR is not appropriate and needs to be replaced by a different requirement. Again, my point is all these related to a screening of events and hazards. The driver to the staff was it's due to the fact that ALWRs might have significantly lower core damage frequencies and larger release frequencies and the current screening criteria might actually screen out hazards that could be significant contributors based on the screening criteria.

So Reg Guide 1.200 says in those cases that you should actually lower screening criteria if you're overall risk is lower. So we've replaced a number of the supporting requirements related to hazard screening. And I just note on here that there's also an effort internal to the standard to take -- that was provided with them on these supporting requirements that changed the approach to screening and there's a revision to NUREG-1855 that's also incorporating this same kind of need to

replace the hazard screening. NUREG-1855 is on uncertainty.

CHAIRMAN STETKAR: Why is hazard screening in -- I don't remember anything in that --

MS. DRUID: There's a whole chapter and there's always been a chapter on screening criteria in 1855.

MR. HARRISON: But that chapter is being revised to incorporate these replacements.

CHAIRMAN STETKAR: Okay.

MEMBER BLEY: It's not specific to hazard. It's in general how to do screening.

MS. DRUID: It's general, but it goes and says, okay, when you look at a PRA, you have screening of all different things. You have screening of hazards, you have screening of sequences, you have screening of basic events. So it talks about it in that regard.

MR. HARRISON: So in going down this path what we did in a number of places -- we have the internal event screening, which is IE-C6. And we'll look at that in a second, but oftentimes in the other hazard groups, the flood, fire and on, the external hazard screening in general, we

referred back to this and said apply it in the context of fires and you'll see how this works.

And this one might be easier to see, the current one up here. I'm not sure how easy that is to read.

So the first of this is very similar, but basically it has three main areas that you can screen. You can screen the initiating event at 10 to the minus 7 per reactor year if it doesn't involve and ISLOCA, containment bypass or reactor pressure vessel. So it's not going to go directly to a release. You can screen at 10 to the minus 7. Again this is the current standard. You can screen at 10 to the minus 6 if core damage doesn't occur unless -- two additional trains of mitigating systems have to fail independent of the initiating event.

The next one is there was this screening criteria that was more qualitative. If a reactor shutdown is not an immediate occurrence, the event does not require the plant to go to shutdown conditions until sufficient time has expired during which the initiating event condition with a high degree of certainty are detected and corrected by the normal plant operation -- or

normal plant operation is curtained. And it says, the comment is if either criterion (a) or (b) above is used. So if you use the quantitative criteria, then you have to confirm the values are consistent with the data analysis and quantification process.

So the replacement one goes on for a couple of pages and we've expanded. So we still have that 10 to the minus 6 one where you have at least two trains of mitigating systems have to fail independent, but we've also added in the phrase "and less than 10 percent of the initiating events mean CDF and core damage." So it not only has to meet 10 to the minus 6, but it has to be less than 10 percent of the internal events core damage frequency. So if you get a very low core damage frequency for your plant, you may have to come back and add in some things you thought you screened out. You may have screened them at 10 to the minus 6. Now you have to put them back in because you're below 10 to the minus 7. So this makes an iteration process occur.

The same is on the 10 to the minus 7 frequency with an ISLOCA. We added a couple of other things to make it clear. Containment bypass, containment failure, direct core damage, for

example, reactor pressure vessel. And again, this has that you can use that 10 to the minus 7, but you have to make sure that in this case that it's less than 1 percent of the internal events mean core damage frequency. So again, if you get an excessively low plant CDF, you may have to come back and say do I have a phenomena that takes me directly to a release and fails -- results in core damage, or give me a bypass scenario and fails and it gets me core damage.

We then added, if you will, an absolute screen that says if the initiating event is below 10 to the minus 8, you can screen it.

CHAIRMAN STETKAR: So essentially that's your de minimis --

MR. HARRISON: Yes.

CHAIRMAN STETKAR: -- value for large release frequency?

MR. HARRISON: Effectively, yes.

CHAIRMAN STETKAR: Because that is --

(Simultaneous speaking)

MR. HARRISON: I can --

(Simultaneous speaking)

CHAIRMAN STETKAR: That's the meteorite event?

MR. HARRISON: Right. Right, and it says if it's below that, we're not going to actually make you go off and do meteor strikes or space shuttles falling out of the sky and stuff. So there's a low limit.

We then enhance the thing about the plant trip and shutdown and put in some specific criteria, because when someone says high-reliable action or high confidence that you will avoid a plant trip, implicit in that is you're basically saying it's guaranteed that we're going to take care of the plant. So again, this is dealing item 8 originally where it's not an immediate occurrence and I can take actions until sufficient time has expired with a high degree of certainty. So we went in and said if you're going to take credit for operator actions to either condition or to avoid a plant trip, or have a controlled shutdown, then assure that the credited operator action is of an exceedingly low probability. And again, we've stuck in the number 10 to the minus 5 collectively.

CHAIRMAN STETKAR: Does that make any sense? I mean, if I'm looking now at a design certification or COL condition where we've already established that they don't have any procedures,

they don't have any training, they don't have any operators, they don't really know what their human/machine interface is going to look like, it strikes me that a reliability of 0.99999 is really darn good, given the lack of anything that I can point to for people. So are we now going to get people gaming this?

MR. HARRISON: Well, the concern was the way it was written --

CHAIRMAN STETKAR: By putting this number in here?

MR. HARRISON: -- originally we've had people say it's a highly reliable action and you don't know what that means. And so this almost becomes a design commitment. For you to be able to get a number like this, you're going to have to say it's in the control room, he can make a quick diagnosis, has obvious instrumentation. Now all he's got to do is do one or two simple actions in the control room. If he has to leave the control room or deal with something else, you're most likely not going to get a 10 to the minus 5.

In other words, this is in the screening process, so it's like we don't want -- because of the low numbers that you might get for

the overall CDF, we don't want you screening out things based on condition 8 simply because you think it's a -- what was the phrase there -- a high degree of certainty. We say if you're going to tell me it's a high degree of certainty, I want you to write it down and tell me the analysis. So we're trying to give a quantitative factor to a what's in the words right now that are qualitative and squishy in my mind.

CHAIRMAN STETKAR: I certainly agree that the qualitative and squishy stuff is not good, but --

MR. HARRISON: Now, is the 10 to the minus 5 -- do you -- at this stage of a design cert it's based upon how they think they're going to operate the plant. And so this is one of those huge assumptions of I'm going to avoid core damage or I'm going to avoid that plant shutdown because I'm going to fix X, and yet I haven't built the plant and operated it and figured all that stuff out yet. So that action better be simple and straightforward.

CHAIRMAN STETKAR: In principle, because this is guidance for the staff, as long as this raises a flag to both the applicant and the

staff that they had -- if they're going to invoke that bullet, that they had better well have really good justification for a teeny, tiny number.

MR. HARRISON: Right, and that's the intent.

CHAIRMAN STETKAR: Okay.

MR. HARRISON: That's the intent, is that instead of telling me that you believe it's highly reliable -- or tell me, show me the quantification and what the actions are instead of --

(Simultaneous speaking)

CHAIRMAN STETKAR: Yes.

MR. HARRISON: Again, this is at the screening level, so it doesn't mean that -- they may actually end up with some action that's 10 to the minus 4, 10 to the minus 3. It's just that you're not going to be able to screen out at this point. You're going to have to do the analysis and come back with a number.

CHAIRMAN STETKAR: Well, the key is to get a number that small I have to do a darn good analysis.

MEMBER BLEY: Well, and --

CHAIRMAN STETKAR: Right?

MEMBER BLEY: -- for it to be believable you need to know something about the other things --

(Simultaneous speaking)

CHAIRMAN STETKAR: -- nothing about. That's right.

MEMBER BLEY: -- which are not in place at this time.

MR. HARRISON: Right, so if someone's going to go down this path and give me a 10 to the minus 5 for -- then they're going to have to say; again it's simple, I'm going to put it in the control room. I'm going to put the indication in the control room, the alarms in the control room. The operators will be trained exactly on what to do, maybe the first five steps of their --

CHAIRMAN STETKAR: And they always --

MR. HARRISON: Right. And then it becomes almost like a commitment as they go forward to address that thing.

CHAIRMAN STETKAR: Ninety-nine thousand, nine hundred and ninety-nine times out of a hundred thousand they're going to know precisely what to do to do it right.

MR. HARRISON: And most people won't be

able to use this to screen out things. And again, that's why we put in 10 to the minus 5. The industry has already complained informally about the practicality of having a number of 10 to the minus 5, and I said, yes, but if I put 10 to the minus 4, that means you're going to screen stuff out. Ten to the minus three you're going to screen stuff out. I want you to screen in, not out --

CHAIRMAN STETKAR: Yes.

MR. HARRISON: -- on the words in the --

(Simultaneous speaking)

MEMBER BLEY: Okay. I see what you're saying. I've had a little trouble. It's organizing --

MR. HARRISON: Yes, it's one of my convoluted sentences.

CHAIRMAN STETKAR: Well, I stumbled across the number. And back to my original question, is it really feasible for somebody to demonstrate within any credibility that type of number given the lack of information at these stages of the licensing process. And what I'm hearing is it may not feasible to do that, but you're giving somebody at least a shot at it and

telling them they better have good justification for it.

MR. HARRISON: Right.

CHAIRMAN STETKAR: And in that sense as long as the staff and the applicants are aware of it, let them try to make their case, I guess.

MR. HARRISON: And again implicitly how I've seen people screen using 8 is they don't even consider the equipment. They keep thinking, oh, I just do -- he goes and fixes a pump or he goes and turns a valve. Well, there are valve fills to close or valve fills to open failure rates that you've got to include in that. And most people forget about that, so that's why it has this convoluted sentenced about collectively. It's the equipment and the person have to work with that reliability.

MEMBER SCHULTZ: Donnie, I've got a quick question on the definition you have for "replace" on 22, slide 22.

MR. HARRISON: Oh, okay.

MEMBER SCHULTZ: Can you bounce back to that? No.

MR. HARRISON: Oh, I went the wrong way.

MEMBER SCHULTZ: Yes, there you go. On the second line of the first sub-bullet there, "eliminate hazards that are significant contributors to risk," do you mean "significant," or do you mean "dominant" contributors?

MR. HARRISON: I'm using "significant" as it's defined in the ASME/ANS standard. How's that for a good answer? Significant can be --

MEMBER SCHULTZ: I'd have to go look.

CHAIRMAN STETKAR: Point zero zero one vessel you risk achievement worth greater than two.

MEMBER SCHULTZ: Okay.

MR. HARRISON: Well, actually in the standards also a one percent contributor -- an accident sequence that's a one percent contributor to the core damage frequency of a group. Right?

CHAIRMAN STETKAR: It's got the sequences. It also has --

(Simultaneous speaking)

MR. HARRISON: Significant components.

CHAIRMAN STETKAR: Yes.

MR. HARRISON: But it basically has the same philosophy.

CHAIRMAN STETKAR: Okay.

MR. HARRISON: IT's a percentage of the

total.

MEMBER SCHULTZ: Yes, with that explanation I understand. I get it.

MR. HARRISON: Well, and that gets you to my next point, though. Okay. So --

MS. DRUID: Just real quick?

CHAIRMAN STETKAR: Okay.

MS. DRUID: The standard nowhere uses the word "dominant" or --

(Simultaneous speaking)

MEMBER SCHULTZ: Apparently not. I understand that.

MR. HARRISON: We got rid of it.

CHAIRMAN STETKAR: Which is good.

MEMBER SCHULTZ: Yes.

MR. HARRISON: Okay. So this replacement goes on. There's four "ensures." The first "ensure" is similar to the one that was in the old one that says just make sure you're consistent with the data analysis and the quantification. But then there are two additional "ensures." One it says "the mean cumulative contribution to CDF of the internal events that have been screened." So you take those internal events that you've screened out. That's got to be

less than five percent of the total of your CDF.

So even if you made that 1 percent or that 10 percent screen, you may still end up with too much got screened out, so now I've got to start adding stuff back in. So this is a check to make sure that happens. So we do five percent on the CDF and five percent on the large release frequency so that all the screened out stuff can't be more than five percent of your risk. And again, that's kind of part of the idea of looking at the definition of what's significant?

And then the last one is just that if you apply some other screening, then you have to define it and provide a basis for it and make sure you're not screening out significant contributors.

CHAIRMAN STETKAR: Donnie, since you've looked at them all and Mary has them memorized, is there in a standard -- something just flashed in front of my head. Is there in a standard anything about truncation when you do the quantification? There is? Is there --

MS. DRUID: There are. If you go to QU, there are sever supporting requirements on truncation and that it's iterative. And you keep iterating until you can show that you captured I

think 95 percent.

CHAIRMAN STETKAR: The only reason I just thought about it was this is somewhat similar to that. In other words --

MS. DRUID: And there you go.

CHAIRMAN STETKAR: -- if you're allowing them to throw away 20 percent because of truncation -- this is a lot more stringent than that, so it ought to be sort of balanced in that sense. In other words, if there is guidance on the quantitative truncation part of the process, that this is conceptually similar to that. In other words, we're willing to accept kind of 95 percent or better than -- of what you would quantify if you could quantify everything totally.

MS. DRUID: Right, if you look at QU-B3 --

MR. HARRISON: B3 uses five percent as the applying for convergence.

CHAIRMAN STETKAR: Fine. So that's consistent with this. Thanks.

MR. HARRISON: So that replacement of IE-C6 then gets referred to as we go into the other hazards as use that guidance specific to your area.

Another example where we replaced

things was external hazard screening C1. I'll bring that up. So this is the words that are in the current standard: "For screening out an external hazard any one of the following three screening criteria provides an acceptable basis." Again, this is something that we've been trying to get changed in the standard for awhile. Criterion A is using the current design-basis-hazard event cannot cause core damage. I would argue that if you have a design-basis-hazard that can cause core damage, you've got a problem with your design-basis.

(Laughter)

MR. HARRISON: Because by default design-bases always have to succeed, right? Now this is saying the hazard, so it's not the whole sequence. But Criteria B, the current design-basis-hazard event has a mean frequency less than 10 to the minus 5. If you notice, like we were talking during the break, seismic hazards, design-basis is usually somewhere around 10 to the minus 4. So it would be greater than that, so you couldn't screen out seismic, but there's a lot of tornados, other hazards that would be screened out using that design-basis-hazard.

CHAIRMAN STETKAR: Really big tsunamis.

MEMBER BLEY: Actually, this requirement says you only have to meet one --

MR. HARRISON: One, yes.

MEMBER BLEY: -- of A, B and C.

MR. HARRISON: Yes.

MEMBER BLEY: You might fail on B that you're talking about, but --

MR. HARRISON: Well, if I can screen on A, I'm still screened.

MEMBER BLEY: Right.

MR. HARRISON: Right. So C was core damage frequency calculated using a bounding or demonstrably conservative analysis and has a mean frequency of less than 10 to the minus 6. And again, for a plant that's calculating and answering the 10 to the minus or 7 or 8 range, that could be a significant contributor at that level. So we said to replace this screening. Again, the very first one says, "Go use supporting requirement; i.e., C6, as applied to the external hazard."

The other one is, "The external hazard affects directly and indirectly only components in a single system." This comes from another supporting requirement. "And it can be shown that

the product of the frequency of the external hazard and the probability of the failure given the hazard is two orders of magnitude lower than the product of the non-hazard; think internal events, for the corresponding initiating event." In other words, if it's less than one percent of the same sequence in the internal events, you can screen it out. Just note that you screened it out at one percent or less. That's really what all of (b) is trying to get at.

CHAIRMAN STETKAR: I had to write an equation for (b).

(Laughter)

CHAIRMAN STETKAR: It makes if you write the equation.

MR. HARRISON: Yes. It's a very long one and again it's trying to say you don't have to model something just because it's there if the only effect is one percent of what you already have modeled in the internal events.

MEMBER SCHULTZ: I like that explanation better.

CHAIRMAN STETKAR: Yes, that's essentially what -- if you write the equation, it's sort of, ah, okay, that's what it says.

MR. HARRISON: Now the last one is a caution. It says, "If the external hazard affects multiple systems directly or indirectly, don't screen on that basis.

MS. MROWCA: I guess before moving onto the next one, just one thing of note is that because the screening criteria could be used generically for new reactors as well as operating plants, we worked with NRR and we got a head nod that they're generally okay with this. So this is what we're going to move forward with as the Agency.

CHAIRMAN STETKAR: Good.

MR. HARRISON: Yes, so NRR is on board with going forward and we're putting in NUREG-1855.

CHAIRMAN STETKAR: You didn't hear me whine much about this either. You've heard me whine about the screening before, so --

MS. DRUID: And we had given ASME and ANS -- we had sent them a formal letter with a lot of the problems we still had with the standard, and the screening criteria was one of our biggies that we pointed out.

CHAIRMAN STETKAR: Good.

MS. DRUID: Do they're working on this

and we're feeding them information that Donnie has put in the ISG, that we've put in 1855, so that we're all consistent, and hopefully the standard will also be consistent when they get the next edition out.

MR. HARRISON: Okay.

CHAIRMAN STETKAR: I found the stuff in 1855, by the way. I'd just forgotten.

MR. HARRISON: Okay. The next category was -- we're close to the end of the categories. Enhancements. This is just where the SR needs to be enhanced to specifically address something about the design cert or the COL stage. Most of this is related to expanding the documentation requirements related to uncertainty due to the fact that there's more assumptions in these stages and there is a lack of information and data. There was a couple cases where this enhancement was actually put in on screening of hazards where maybe it had all of the right words and we just wanted to make sure it referred back to IE-C6, or something like that.

So here's an example. I think this is fires. QNS, I think that's fires. It just had this simple thing. It said, "Define quantitative screening criteria that ensures that the cumulative

impact of screened physical analysis units on CDF and LERF is small. It's like, okay, you don't establish screening criteria. You just say define it. So we said, no, enhance it. You can have that, but then had an add-on that said "Use supporting requirement IE-C6 of Part 2 as applied to fire for screening fire areas." The referenced SR, as replaced, contains language on -- and this is my point. It contains language on ensuring the cumulative of the screened events/hazards are small; that is, less than five percent, because now I've brought in all those ensuring statements. I guess that's a word, isn't it? I don't know.

Okay. Then there's the category of new. New is there was no SR in this area and we needed to add them. Again, almost all of them relate to the documentation of internal fires. That's mainly because of the structure of how the fire section was developed in its documentation requirements. There was one new one that was added in Part 6 related to documentation. All our documentation of uncertainty due to the reliance on more assumptions because of a lack of information and data.

Sometimes instead of being new it was

an enhancement because something already existed and we just needed to add this additional piece to it. So an example would be, again in fires document, the sources of model uncertainty and related assumptions due to the status of designs. So they've got that on model uncertainty. We said you also need to document the limitations and bases due to the status of the design, site, operational, maintenance information or data associated with the analysis as documented in FSS-H1 through H8. This is an expansion on that whole thought.

Oh, I'm sorry, these are two different ones. I'm sorry. This is where we've added both of these, where we've added the first one and then we added the second one. So there was a CS-C4 and there was an FSS-H9. They didn't cover that area, so we've added that in. I got ahead of myself. Okay. So that's the different categories and examples of how you could get in the different categories.

After we went SR-by-SR, we started lumping them together to see -- we had already kind of laid out what we thought some of the significant challenges were for our design cert and COL. And then we started putting those SRs that we say

cannot be met or are not applicable or need to be replaced -- we started putting them into different groupings and we came out with these eight groups by the time we got done. So we walk through examples of each of these that will be different with -- similar to what you've already seen.

So here are site-specific features and characteristics. Some of SRs require site-specific information. A DC application is not going to have that. And here's our point, it mainly affects the ultimate heat sink features and external hazards. Regarding the heat sink features, the design cert can make assumptions regarding those features. That's a small piece, but it might be an important piece. It's a small piece of a PRA in the systems area and in the support system initiators. Design cert usually in Chapter 2 puts in site characteristics, site interface requirements to base their external hazards analysis. There are some SRs that say ensure you've addressed all the hazards. You can't do that design stage because you don't know the specific site you have. All right? So that's a challenge. However, the COL applications have site-specific information so they can -- and you're not going to like my

bounding choice, but they can directly address these SRs with their site-specific information or they can confirm the DC hazard analysis bounds their hazard. So that's just the --

So here's an example of where a DC cannot meet a requirement.

CHAIRMAN STETKAR: Recommendation. Just be sensitive to the word "bound."

MR. HARRISON: Bound.

CHAIRMAN STETKAR: I mean we --

MR. HARRISON: Someone suggested "envelope," and I stuck with "bound" because that was the phrase that was actually used in the SRP and the design cert. So instead of softening it, I just stayed with the language that was already there.

CHAIRMAN STETKAR: In many cases -- no go on.

MR. HARRISON: Oh, I understand your concern. A truly bounding analysis is set to one.

So here's an example in the seismic section where -- in the seismic section when you get to the back it says, "The analysis shall be performed to assess whether in addition to vibratory ground motion, other seismic hazards such

as fault displacement, landslide, soil liquefaction," all these other phenomena need to be included. "If so, the seismic PRA shall address the effect of these hazards." A design cert, what most people are going to do is say we're not going to have soil liquefaction, period. Let's move on. So they cannot meet this to go off and confirm that. Now once they get to COL, they can go off and actually do a site survey and see if there is the potential for fault displacement or something like that.

The other example is in the external events screening criteria. It says, "Supplement the list considered in EX-A1." That's the typical reference sources for external hazards at a table that gives you the hazards with a site-specific and plant-unique external hazards. Well, at design cert you're not going to know what site-specific unique hazard is going to exist, so you can't meet those.

ON the topic of screening events and hazards for analysis, again this is repeating new reactors can be lower. Reg Guide says to use a lower screening value if you believe your base risk is lower. Here you may have had -- for design cert

and COL you could fall into not applicable, replace or enhance, depending on the specific issue. And again, we note that this is being addressed generally for the next edition.

Here's the example I brought up. It's the external hazards screening where it has a second preliminary screening where you can screen out external hazards other than seismic events. The following screening criteria apply. And it refers to the 1975 SRP, standard review plan. If I meet the SRP, I can screen out my hazard. All right? If you talk to the tornado folks, a facility that's designed and built to the 1975 tornado wind frequency up to 360 miles per hour -- you can still get core damage at 120 miles per hour because I knock off the power somewhere in the 70 to 100 mile per hour wind. If both diesels fail to start, I'm going into a station blackout and I'll go to core damage.

So screening based on design criteria, this is a deterministic criteria that should not be in the standard. We've told them to take it out. In the last round we actually thought we got it out, but then they got -- somebody contested it.

MEMBER BLEY: When was WASH-1400

published?

MEMBER SCHULTZ: 1973, the first time.

MEMBER BLEY: '73? Okay. So this is --

MR. HARRISON: Yes, this is when the final version got published.

MEMBER SCHULTZ: Yes, '75.

MR. HARRISON: So we think this is not an appropriate way to screen because you can have failures at lower frequency. Design-basis has only single failure and the PRA can have multiple failures. So it's not appropriate.

MEMBER BLEY: Just a comment on your slides. I don't know if you'll ever use these anywhere else. This one you say is not applicable. The one back on 34 you said cannot meet. And this was a couple of times. Cannot meet. In your guidance you use a lot more words and it's clear what you're talking about, I think.

MR. HARRISON: Yes.

MEMBER BLEY: The ones that say cannot meet I think can cause you political trouble somewhere because it looks like they can't get through. And you talked about -- you two -- three of you went back and forth on that, I think, once.

I just mention that.

MR. HARRISON: Yes, well, not only that, last week when were at the Standards meeting we were talking about this and there is a sensitivity to the phrase of saying you cannot meet anything in the standard.

MEMBER BLEY: I would think so. I know it isn't quite what you mean. At this time you can't address it.

MR. HARRISON: Yes. And again, it's like Mary had said earlier, just because you cannot meet one supporting requirement doesn't mean you don't meet the standard. And again, I've tried to in the context of applications said you have to address the standard. You don't meet the standard.

MEMBER BLEY: Fair enough.

MR. HARRISON: Right? Because each individual SR may have a -- you meet it, you meet it at one, you meet at three. What does it really mean? But, yes, there is a large sensitivity that we heard loudly, I think, when we talked about this at the Standards Working Group.

Plant-specific layouts and capabilities. Most of this is in the fire area. It's where you don't have cable routing. And so

almost everyone's going to use the exclusion approach, which basically if I know the cable is not going to be in that area, I can take credit that it's not going to burn up. But if I'm not sure, I have to assume it burns up in every fire in that area, because I don't know. So typically the advanced reactors fortunately will have cable -- fire separation, so they'll know that the B cables is in the B quadrant. It's not going to be in the C quadrant and they can apply the exclusionary approach. And again, by the time they actually get to operation, they're going to have to walkdown the plant or walkdown their cable tracing, talk through it to make sure that there's nothing in the wrong area.

CHAIRMAN STETKAR: I wasn't going to ask this, but I figured I might as well because we're taking up time and we're not going to finish before 5:00.

So in the standard -- now I'm not familiar with the standard like you folks are. I tripped across the notion of to meet Capability Category I you have to assume one hot short.

MR. HARRISON: Yes.

CHAIRMAN STETKAR: To meet Capability

Category II you have to assume to two hot shorts. Is that consistent with what the staff has applied in the PRAs that are being done to support NFP-805 transitions?

MR. HARRISON: I believe so. The standard got developed in parallel slightly after the development of NUREG -- what is it 60 --

CHAIRMAN STETKAR: Sixty-eight fifty.

MR. HARRISON: -- 6850.

CHAIRMAN STETKAR: So there was a lot of discussion about how many multiple spurious operations do you need to assume.

MR. HARRISON: Yes, so the assumption of two or more, or two --

CHAIRMAN STETKAR: No, it says up to two.

MR. HARRISON: Up to two.

CHAIRMAN STETKAR: It doesn't say two or more. It says up to two.

MR. HARRISON: Up to two is for Capability II. I think that's what it probably says in --

(Simultaneous speaking)

CHAIRMAN STETKAR: I don't know. I was just curious.

MR. HARRISON: I'd have to go check, but --

CHAIRMAN STETKAR: I'll look it up. Well, I'll look it up by Thursday, because we've got NFP-805 Thursday.

The reason I bring it up is that fire testing has shown that you can get many more than two from burning up a cable. You can get multiple shorts, especially when you have a number of cables. And I don't remember that those specific -- if it's Wednesday, you get one and if it's Thursday, you get two criteria were still around.

MR. HARRISON: Yes, and I mean to be frank, I'm not exactly sure what the guidance says, but it wouldn't surprise me if it does that.

CHAIRMAN STETKAR: But I'm sure there's an FAQ on the -- frequently asked question --

(Simultaneous speaking)

MR. HARRISON: -- hot sort. I think --

(Simultaneous speaking)

CHAIRMAN STETKAR: There's a lot of discussion about treatment of multiple spurious operations. I just can't remember. Do you remember, Dennis? Do you remember what the current state of compromise is on the treatment of numbers

of multiple spurious operations in the NFP-805 world?

MEMBER BLEY: No, I would ask Donnie if I had that question.

(Laughter)

MR. HARRISON: I can't remember.

MEMBER BLEY: We talked about it, but, no, I don't remember.

(Laughter)

CHAIRMAN STETKAR: Go on.

MR. HARRISON: Okay.

MEMBER BLEY: Well, I would have asked Donnie in his old job.

MR. HARRISON: Yes, in my old job and I would have handled it --

(Simultaneous speaking)

CHAIRMAN STETKAR: Immediately in his old job.

MR. HARRISON: I've been away from that. I'm not quite sure what it is.

Okay. So here's plant-specific layouts and capabilities. Again, this is one where we say you cannot meet the SR. A couple of different ones, both in cable selection. A5, include cable conductor-to-ground. Specific cable constructed

information won't be available like would be available. Specific failure modes will not be modeled if they're using the exclusion approach. They'll just say it's in the area. That cable is failed. They'll find --

(Simultaneous speaking)

CHAIRMAN STETKAR: But the way they do this in practice -- because I'm not kind of familiar with this. They way they do it in practice is they say, well, it's likely that I would be routing the cables through this room here that we're sitting in, so I can't exclude this room. But now when I burn this room, I'm now within the construct of how many of these things I need to account for. I need to at least count up numbers of hot shorts, like one.

MR. HARRISON: Yes, this gets you into kind of a -- and it's done by again exclusion. I have to be assured that it's not in the room. If I'm not perfectly assured it's not in the room, then I assume it is in the room and it's going to be burnt up.

CHAIRMAN STETKAR: That's right. But once it's in the room and I burn that room, I mean, the exclusion is just getting --

MR. HARRISON: Right.

CHAIRMAN STETKAR: -- my assumed inventory of what's in this room --

(Simultaneous speaking)

MR. HARRISON: And can I get the failures.

CHAIRMAN STETKAR: And then once I burn this room, invoking that CS-A11 doesn't absolve me of the need to do anything in this room. It just establishes an inventory of what's here.

MR. HARRISON: Right.

CHAIRMAN STETKAR: Okay.

MR. HARRISON: Yes, it tells you -- again, it's cable selection, so it now says room X has all this cable. I really don't believe all that cable is going to be in that room, but I can't tell you it's not going to be in that room. That's how CS-A11 works.

CHAIRMAN STETKAR: Yes.

MR. HARRISON: Okay. Plant-specific operating experience and data. Again, the design cert and the COL will not have plant-specific operating experience. They won't have plant-specific equipment failure data. They won't actually know the alignments for exactly for --

possibly for maintenance surveillance testing, train alignment frequency. The frequency of them. They may know how to align the system, they just may not know the exact frequency of those alignments.

CHAIRMAN STETKAR: You brought up maintenance and I might as well -- there's some discussion, and I won't bring up specific items, but something that I've brought up in previous design cert PRAs is that I think all of the plants that we've seen to date have four trains of safety systems. And if you read the tech specs, the licensing criteria is two are required for success in design-basis licensing. The tech specs are written such that I can one train out indefinitely. That doesn't mean I go dynamite it. And I enter a limiting condition for operation with a time clock if I have two out simultaneously. So that's the way the tech specs are written.

It's done that way because if you look at plants in Europe that have four trains, they do online maintenance and they take one train of equipment out while the plant is operating. They take the whole train out. And they do it on a rotating basis.

I've seen some plant PRAs for the design certification that have a very limited treatment of maintenance at all because they say, well, we don't have this plant-specific operating experience and data, so we can't say anything about maintenance. So they put in, well, we know we have to put diesel maintenance in there because people will slap us on the knuckles if I don't put diesel maintenance in there. But they don't have anything for a lot of other things. That's rare.

I've seen no plant put in what I call a correlated train level unavailability due to maintenance as is allowed by the tech specs. I haven't seen anybody do that. And because I've never seen anybody do that, I've never seen anybody put in the likelihood that two -- one train is out and equipment in a correlated sense is out simultaneously. In fact, people go -- if they put maintenance in, they try to exclude those things.

MR. HARRISON: Right.

CHAIRMAN STETKAR: The guidance doesn't point -- it depends on how you read the guidance right now. The guidance doesn't kind of highlight this. The reason I bring it up is I've been involved in PRAs of plants how do this train-level

maintenance and it's a visible contributor to risk. It's not necessarily the most important contributor to risk because those plants tend to be dominated by external events that have a much broader aspect, but from internal events it tends to be invisible.

Now you're right that until I know how I'm going to organize my preventive maintenance at my plant, and until I've accrued plant-specific operating experience that says, oh, you know, X percent of the year I have train A out and X percent of the year same percentage typically I have train B, and whatever. And if I look at the experience, some fraction of X, I've got some other stuff out at the same time. You don't have that until you've got actually quite a number of years' worth of operating experience. You might know the plant.

But there are a large number of plants in Europe that have been operating like this for many, many, many, many years. Not so much in the United States, but there is operating experience available to tell people doing a PRA roughly what fractions of the time, frequencies and durations, or just fraction of the time you're in these configurations. That information is available in a

generic sense.

MR. HARRISON: Right.

CHAIRMAN STETKAR: Might be French, might be German generic, but it's available that somebody can just say, well, I can't do anything, so I won't do anything.

MR. HARRISON: And that's not our position. Our position is use general operating practices to derive something and then document that assumption so you can confirm or change it later. But, yes, so I would agree with where you're headed, which is especially at the train level you should be able to put in --

(Simultaneous speaking)

CHAIRMAN STETKAR: I mean, you don't know whether it's going to be a week a year, seven days, five days, four days. It's less important the precision of that number than just getting the notion in the model.

MR. HARRISON: That it's in there, right. Again, it's the concern if I don't put it in at design cert or COL, it's likely I'll forget about it for awhile and it may go cycles before it gets to that. So, no, I agree. So what our position is is look at general operating practices,

put in the maintenance intervals, the maintenance frequencies, the testing frequencies, what those alignments likely look like and put that in the model and then just document that as an assumption.

CHAIRMAN STETKAR: As I read -- if the -- well, just look at -- I'll point you to SY-A19, A20 and DA-C14.

MR. HARRISON: See, I've already read your mind. I was already on --

(Simultaneous speaking)

CHAIRMAN STETKAR: And look at those and think about the words in there.

MR. HARRISON: Yes --

(Simultaneous speaking)

CHAIRMAN STETKAR: I think you can read the words one way that says, well, it's not an out. But I could read the words the other way that says, well, I don't understand enough at the DC or COL stage to be able to do this and you're giving me an out that I don't need to do.

MR. HARRISON: And, yes, I'll go back and look, because the intent was that bullet at the very bottom of the page which --

(Simultaneous speaking)

MEMBER SCHULTZ: And in fact, you ought

to do it for sure.

MR. HARRISON: Yes.

CHAIRMAN STETKAR: Yes, and that's the -- yes.

MEMBER SCHULTZ: And have the information to do so.

MR. HARRISON: Yes, the point is you cannot meet the requirement as it's written because you don't have that information. However, you should go off and put something in your model that --

(Simultaneous speaking)

CHAIRMAN STETKAR: I was going to say you can't meet it in a precision sense, but you can still make a reasonable assumption, a reasonable estimate. MR. HARRISON: And maybe when we talk about what it means to "cannot meet," maybe we can --

(Simultaneous speaking)

CHAIRMAN STETKAR: Yes, I mean, that's --

MR. HARRISON: -- just being back to Dennis' -- well, it also addresses Dennis' concern of what does it mean "cannot meet." It's where you change that to be something that conveys what we do

want to do in those cases.

CHAIRMAN STETKAR: Or at least draw attention to it's a sensitivity issue.

MR. HARRISON: Okay. Then there's plant-specific guidance. We've already gone over this as a general thing where we've just said use good practice and operating guidance that is available any time the supporting requirement calls out to use plant-specific procedures.

So here's just a couple more examples where it says define the accident sequence model in a manner that's consistent with plant-specific system design, emergency operating procedures, abnormal procedures, plant transient response. You're not going to have EOPs and AOPs, but you are going to know how your design for those conditions should be and what you expect. So you can use the typical good practices and operating guidance to derive that. Again, you document the assumptions you're making in doing that.

The same with HR, the human reliability analysis, A1, where it says to identify through a review of procedures and practices those tests, inspection and maintenance activities. You're not going to have that procedural practice, but you're

going to have good practice and operating guidance, so you can use that to drive what those conditions are for your HRA analysis.

Interviews. There's a handful of supporting requirements that require interviews of or reviews by the operations and training personnel. A lot of these actually it tells you to have review your procedures or review your analysis to ensure the PRA reflects actual operations and training practices.

Now design cert you don't have training practices, or COL you don't have those practices set up, so those SRs that drive you to confirm that your training practices and the way the PRA is modeled are the same or don't exist. You're also not going to have necessarily operations and training personnel with plant-specific experience because you haven't had any experience yet. So you're not going to get the old timer that said back 15 years ago we had this thing happen and this widget failed.

CHAIRMAN STETKAR: Yes.

MR. HARRISON: You're not going to get that insight.

CHAIRMAN STETKAR: But the point that I

brought up earlier is that old timer that says, well, at my plant 400 years ago we had this happen and it could happen at your plant. How come you haven't accounted for that?

MR. HARRISON: Right.

CHAIRMAN STETKAR: Or, well, hell, we'd never do that because our procedures -- you know, they would shoot us if we ever did that. So why are you guys going to do that? And that sort of insight is relevant.

MR. HARRISON: Right, and I took down the comment earlier so that when we look back at this if we want to add some more verbiage that says but you should do -- not just you can meet it by talking to people, that you should actually do more.

So here's an example where you can actually meet the interview one. It's confirm that the system analysis correctly reflects the as-built, as-operated plant through discussions with knowledgeable plant personnel. We said you can achieve this through interviews of knowledgeable design personnel based on the expected as-to-be-built, as-to-be-operated plant.

Again, partly why we said you could

meet this is because it was at such a high level in the requirement. It's knowledgeable plant personnel. Well, engineering, plant operations. At this level you could actually say you could meet that with design staff. There are a number of them where we say you can't meet it, and those I think I need to go back through and say but can I provide some more guidance in what we do want you to do?

Walkdowns. For a design cert you can't walk down a site because you don't have one most likely. So you can't collect information on the site and you can't verify that the PRA model properly reflects that site condition. Further, design certs and COLs cannot walk down design features to verify that the PRA models properly the plant systems and features of the site.

CHAIRMAN STETKAR: And you make this point I think for the external hazards. You can walk down the site.

MR. HARRISON: Once you get to the COL you can walk down the site, yes. That's why this is split into two parts. One is the site. The other one is plant-specific features. There's some that -- like in fire there's an SR that talks about structures being exposed to heat. Well, they're

going to write that one off and say, well, we're not going to have any structures that are exposed to heat. Well, at some point you have to walk down to confirm that, but you won't be able to do that until you're approaching fuel load, most likely, for a lot of these sites to be complete.

So here's a couple where we said you can't meet the requirement, D1, of the external hazards. Confirm the basis for the screening out of an external hazard through a walkdown of th plant and its surroundings. Well, you can't confirm that screening out is appropriate because you don't have a site to screen.

Internal flooding has one that says conduct plant walkdowns to verify the accuracy of the information obtained from plant information sources to obtain or verify spatial information and design features that you're crediting. Again, you can't verify that information because you can't walk down to make sure the sump pump is in the room because you haven't built the room yet, let alone the sump pump.

So again, by the time you get to fuel load you can do these, but at this stage you can't.

Okay. The last topic was

uncertainties. We recognize that because you're going to be making more assumptions in these stages of the design and licensing and you haven't built the plant, you haven't operated the plant, you're using generic information, there's going to be more uncertainty and reliance on more assumptions. Therefore, we enhanced the number of the SRs that we talked about before about documentation and created some new ones, mainly in fire, to document that limitation and the potential impact that has on risk-informed applications. And plus characterize the source of that model uncertainty.

So here's a couple I picked out of the high winds where it says document the wind hazard analysis manner that facilitates PRA applications, upgrades and peer review. We added to that document the limitations and bases due to the status of the design site. So if someone's got a high winds PRA, they need to write down I did it generically because I'm at design cert and I don't have a site, so I just used these parameters to define my high winds. When I get a site, I'll have to confirm those parameters or change my model.

MEMBER SCHULTZ: You just described that in a fairly easy manner, and of course the

uncertainty treatment comes into play in a whole host of different sections and --

(Simultaneous speaking)

MR. HARRISON: And this --

MEMBER BLEY: SCHULTZ: And if I were just reading it and thinking about what I seem to be asked to do, I would be overwhelmed and try to think of a way to do it simply. I guess I hadn't assumed it would be that simple to do.

MR. HARRISON: Yes, at this point almost all of these -- it's not in a quantification part of uncertainty. We're saying but you need to write it all down. You're going to have a --

MEMBER SCHULTZ: Just to appropriately document it to some level of --

MR. HARRISON: Right.

MEMBER SCHULTZ: -- detail that makes sense for the process.

MR. HARRISON: Right. Because again, if you think of this as a constantly iterating process, you've been iterating before you even got to design cert. Now you've got your design cert. You're going to iterate to COL. You're going to develop something by fuel load. You still haven't gotten to operations yet. So you're going to

iterate a couple more times probably in the first cycle or two.

MEMBER SCHULTZ: I understand that. When I read the discussion associated with the treatment of uncertainties, I didn't come away with a good understanding of what an applicant was being asked to do, and being asked to do so many different times in so many different ways.

MR. HARRISON: Yes, it's --

MEMBER SCHULTZ: It looked very complicated and I was concerned based on how the guidance is currently written that either the staff or the applicant would be struggling to figure out what would be satisfactory and may err on the side of either oversimplifying or over-complicating this piece, which again appears in so many different places.

MR. HARRISON: Right. And that's partly a standard structure issue that at the end of every high-level requirement section it says "document."

MEMBER SCHULTZ: That right.

MR. HARRISON: Right? And so you get this phrase showing up in 100 different places because of that. In most of those when I'm doing

internal events I've got my initiating event documentation, I've got my HRA documentation, I've got my data documentation. All of these, every time I write that, I've got to step back and say now what's my limitation because I'm a design cert?

MEMBER SCHULTZ: Yes.

MR. HARRISON: And what's does this mean I can and can't do with this PRA because of that? I mean, some of it may be simple where I said, well, I can't do any risk-informed applications that require Capability Category II because that all takes plant-specific data that's for significant components. I don't have that. So, yes, it may be much more elaborate and detailed in other areas.

MEMBER SCHULTZ: It may be in the course of the practice that this is all well known, but I was looking for something in the documentation, in the description part of the documentation that described the requirements more fully.

MR. HARRISON: From a personal observation I'd say documentation is one of the weaker elements of the PRA.

MEMBER SCHULTZ: So when I saw it so

many times I thought the idea was to strengthen it.

MR. HARRISON: Yes.

MEMBER SCHULTZ: And again, the level of strength that would be acceptable wasn't apparent to me. I know it's hard to describe appropriately,

but --

MR. HARRISON: Yes, and this not getting to that level where it's saying here's how you should document it or the level of --

(Simultaneous speaking)

MEMBER SCHULTZ: Right.

MR. HARRISON: It just says make sure you've done -- getting people to think about it and write it down is going in the right direction.

MEMBER SCHULTZ: Yes, I agree.

MR. HARRISON: Okay. We're at the second-to-last slide. Do I have the right slides? Oh, you want to go back?

CHAIRMAN STETKAR: No.

MR. HARRISON: Okay.

CHAIRMAN STETKAR: One more thing, because I know you want to wrap up with the next steps and the path forward. Through all of this I found one place that I had a question, and it's on

Supporting Requirement SY, system; B, boy; 2, and it relates to inter-system common-cause where in the standard for Capability Category I and II. It states, "No requirement to model inter-system common-cause failures." For Capability Category III it says, "Model inter-system common-cause failures; i.e., across systems performing the same function when supported by generic or plant-specific data or show they do not impact the results." The clarifications and comments on that requirement state, "CC-I and CC-II contain no requirement for modeling inter-system common-cause failures. The staff expects the DC or COL applicant to address (either model or show it has no impact on the results) inter-system common-cause failures if it is supported by generic data."

That seems to be staff guidance that says you have to meet Capability Category III in this particular area which is beyond the state of practice. So why?

MR. HARRISON: Well, this is --

CHAIRMAN STETKAR: It's the only place I found where you not only --

MR. HARRISON: There's two places where I do this.

CHAIRMAN STETKAR: I missed the other one.

MR. HARRISON: The other one is on the trending analysis of the --

(Simultaneous speaking)

CHAIRMAN STETKAR: I missed the trending analysis one.

MR. HARRISON: Yes, there's these two places. And the reason why: if you think back to current operating plants, the BWRs that have a HPSI and a RCIC, they're considered separate systems, but they model the common-cause failures often times between either the pumps or the mechanism there across system boundaries. Right?

CHAIRMAN STETKAR: Six hundred and seventy-five motor-operated valves.

MR. HARRISON: We don't do that --

(Simultaneous speaking)

CHAIRMAN STETKAR: Why? This says you ought to do it.

MR. HARRISON: Yes. And again, this -- well, yes. And again, the out that we put in is if supported by generic -- we are invoking the Capability Category III requirement here, but only where you actually have data that says you need to.

Here it says support --

(Simultaneous speaking)

CHAIRMAN STETKAR: Well, we have beta gamma delta factors, epsilon, probably not much more than that, for motor-operated valves. They don't say motor-operated valves within the high-pressure injection system. They just say motor-operated valves. So we have data.

MR. HARRISON: Yes, the intent here was to make sure you didn't leave out things that are traditionally --

(Simultaneous speaking)

CHAIRMAN STETKAR: Well, what's traditionally? I now have a four-train plant.

MR. HARRISON: Right.

CHAIRMAN STETKAR: I have four trains of high-pressure injection and low-pressure injection and emergency feedwater, and lord knows what else in an EPR and an APWR, my standard active plant systems. I've got ancillary diesels. I've got non-safety-related diesels. I've got a lot of equipment in some of these plants. And this says that now I need to look at common-cause failures across those system boundaries.

MR. HARRISON: I need to be more

specific.

CHAIRMAN STETKAR: Well, or at least careful here --

MR. HARRISON: Yes, I --

(Simultaneous speaking)

CHAIRMAN STETKAR: -- because this is a place where to satisfy this again in just sort of a pass/fail criterion or in the sense of a staff reviewer that says, well, you haven't addressed common-cause failure in motor-operated valves. You've got four trains. Each train has two motor-operated valves, four systems. I don't know. Do the math. How many motor-operated valves. The alphabet probably isn't big enough.

MR. HARRISON: Yes. No, and I've had personal experience with this. I did slave relays for our plant.

CHAIRMAN STETKAR: Yes, that's --

MR. HARRISON: So after you fail eight slave relays, you know you got a bad batch and the whole plant is going to melt. So, there's not a whole lot of good insight there, but --

CHAIRMAN STETKAR: No, but that's the only -- I didn't find the trending stuff.

MR. HARRISON: Yes, so that's a fair --

again, the intent was when I -- if you go back to my early, early, early slide, I said any time there was what I refer to as the do-nothing supporting requirement, if there was a -- something that says you meet a requirement by not doing anything. We then looked at what the other requirement was in that one to say should you do this other one instead? Right?

CHAIRMAN STETKAR: Yes, but I mean this is the one --

MR. HARRISON: This is one that --

(Simultaneous speaking)

CHAIRMAN STETKAR: -- this is one case where it's pretty doggone explicit, at least the way I read it. And if you use relay examples or motor-operated valves, those types of things, I'm not aware of anybody looking at that.

MR. HARRISON: Yes, and that wasn't the intent of saying that. So we need to be careful on that one of -- the real intent was to get where someone's designated -- again, the same safety function is being achieved by similar components, but for whatever reason they've been designated to be in different systems.

CHAIRMAN STETKAR: High-pressure, low-

pressure injection and emergency feedwater. The same function if you consider feed-and-bleed cooling or emergency blowdown to get low-pressure injection for some sort of --

(Simultaneous speaking)

MR. HARRISON: And it's not -- yes.

CHAIRMAN STETKAR: -- its keep the cool core function.

MR. HARRISON: Right. Yes, and the intent is not to combine the emergency feedwater with the high-pressure injection.

CHAIRMAN STETKAR: Yes, that's the intent.

MR. HARRISON: Yes, we need to make it clear. I hear you. We need to make that clear. And again, it's such a nuance it may not even be worth having in that sense. So, we can take that back and think about it.

Okay. I think this is my last slide.

CHAIRMAN STETKAR: Yes.

MR. HARRISON: The next step is the draft ISG should be going out for public comment very, very, very, very soon. Very soon. We think we're going to have it out for 45 days. And parallel to this we're also engaging the Standards

Development organization on the working group level on potential changes as a similar product as an appendix.

Again, I just note here they may be focused on Capability II as the state of practice in essentially developing what they see as the expected state of practice for the pre-operational period. They also make take guidance all the way up through fuel load or the early operational period before you have actual data, operational data. So we have slightly different boundary conditions, but they may be going beyond where we're at.

MEMBER SCHULTZ: But that makes sense to do so.

MR. HARRISON: Yes.

MEMBER SCHULTZ: But in terms of the first part, the potential for developing similar product as an appendix, how close do you think you are to achieving that?

MR. HARRISON: Let me see, a year ago I would have said not.

MEMBER SCHULTZ: Right, I understand that.

MR. HARRISON: Six months ago I would

have said not. Last week, yes, we might actually get it done. So we've got some assignments we took away from last week.

MEMBER SCHULTZ: That's right. Yes.

MR. HARRISON: There were some on alignment that actually occurred last week at the Standards meeting where for whatever reason people understood our concerns and started agreeing with us.

MEMBER SCHULTZ: What did you present there? You didn't go into this level of detail, I presume.

MR. HARRISON: No, back in September of last year we presented at a high level our concerns with the appendix at that time. In February we went over like the initiating events as an example of how we saw the world and then had some bar chart that says here's how the rest of the internal events piece looks. We hadn't done the external hazards or anything at that point. Well, we had, but they were rough draft at that point. So they were seeing pieces.

CHAIRMAN STETKAR: Yes.

MR. HARRISON: And just to be frank, there's an emotional piece. They had been working

on a standard --

CHAIRMAN STETKAR: Yes.

MR. HARRISON: -- appendix for a couple of years. We walked in and said, no, don't do this. Let us take a shot at it. Then we took six months and came back and said here's what we think. Then they're kind of like, well, how are you different than us and why are you saying no when it sounds like you're saying the same as what we were trying to say? So there's some emotional investment wrapped up in that.

The meeting we had last week, it sounded like there's a path forward. I have a homework assignment that Lynn gave me while I wasn't in the room to go off and do some comparisons of where we were proposing things and what they were proposing and see if there's really not that much different. I have to keep in my mind they were looking at Capability Category II, so the question you were asking right at the very start of the meeting, I'm going to have to address that to address that assignment.

CHAIRMAN STETKAR: Well, and a lot of Capability Category II or separating DC from everything after DC, regardless of where you want

to draw in operational time that line, is another --

MR. HARRISON: Well, and that was one of the struggles we had with the original appendix was it had no distinguishing -- and matter of fact there's a sentence on one of the pages that talks about the capability categories are flexible to the stage. And so technically you could be Capability Category at DC, but as soon as a COL came in with an application, they wouldn't meet Capability Category II anymore. And if you're making applications at the same time using that information, we just saw that as creating chaos.

MEMBER SCHULTZ: It's over-simplifying, but it seems as if you could merge the two, what they have been doing and what you've done, by adding a couple of columns to what you've done.

MR. HARRISON: Yes, and some of it's --

(Simultaneous speaking)

MEMBER SCHULTZ: And incorporating what they have done.

MR. HARRISON: Yes, they refer to things as "alternative requirements." That sounds like it's actually meeting the requirement by an alternative means. That's not what they meant.

MEMBER SCHULTZ: Yes, I understand why you wouldn't like that. Yes.

MR. HARRISON: Yes, so some of this is terminology. The sensitivity to saying "cannot meet," that came out of the meeting. They really don't like being told they can't meet a requirement.

MEMBER SCHULTZ: Yes.

MR. HARRISON: Even though it is a supporting requirement within a standard.

MS. MROWCA: Yes, one of the other issues that we had was it appeared that they were developing this just like what you were alluding to, having a separate appendix that took a plant from application all the way through operation for ALWRs. And that was not the concept that we had in mind anyway from our lessons learned. And we just learned last week they said, no, that's not what we meant, even though it appeared the words on the page --

MEMBER SCHULTZ: Sure looks like it, doesn't it?

MR. HARRISON: And the conversations we had in February were -- I want a transcriber next time I go to a meeting, because I could have sworn

they said that.

MS. MROWCA: But they said, no, that's not what we meant at all. It's like, well, I think we can fix that with a few word changes then. So that's what we started doing.

MEMBER SCHULTZ: Good.

CHAIRMAN STETKAR: Well, I mean, even in today's discussion it's pretty evident that different eyes reading the same words can have different interpretations because you come at them from a different experience base and slightly different motivation in some cases. Well, and the other part of it is, again, I read every single SR at least twice, or five times. And I have in my head what I know what the requirement is and what I expect to be done. And so just a staff point you made, I didn't even think to write down that --

CHAIRMAN STETKAR: Sure.

MR. HARRISON: -- don't go off and try to make all the valves in the plant common-cause failures. That wasn't what I was thinking in my head. But I didn't write down --

CHAIRMAN STETKAR: Sure.

MR. HARRISON: -- that thought process.

MEMBER BLEY: That explains the high-

quality theoretical basis of our common-cause modes.

CHAIRMAN STETKAR: There's some chance that every single car in the parking lot down there has four flat tires because one car had a flat tire last week and another car had a flat tire yesterday.

MEMBER REMPE: This seems to be a private conversation.

(Laughter)

CHAIRMAN STETKAR: It's a long-standing -- anyway, you folks have anything more?

MEMBER REMPE: Yes.

MEMBER SCHULTZ: Yes.

MEMBER REMPE: I have a question.

CHAIRMAN STETKAR: I said -- okay.

MEMBER REMPE: Isn't that you folks, or am I --

(Simultaneous speaking)

CHAIRMAN STETKAR: No, the staff.

MEMBER REMPE: Oh, okay.

MR. HARRISON: You're us folks.

CHAIRMAN STETKAR: You're us folks.

MEMBER REMPE: Yes. Oh, so --

CHAIRMAN STETKAR: Unless there's --

(Simultaneous speaking)

MEMBER REMPE: I have a question about his slide.

CHAIRMAN STETKAR: Oh, okay. Good.

MEMBER REMPE: And I started to do it while you were talking about cars in the parking lot because I thought it didn't pertain to us.

But anyhow, I don't see in here where you'll be coming back to ACRS with what you're going to be doing. What's your thoughts of where you're going? I mean, it might have been nice if we had seen this before it went out for public comment, but perhaps that's not done very often.

CHAIRMAN STETKAR: We have.

MEMBER REMPE: Yes.

MS. MROWCA: It's not out yet.

CHAIRMAN STETKAR: It's not out yet.

MEMBER REMPE: Well, it sounds like if you're going to do this -- are you going to revise this based upon the comments today before you -- I mean, I thought you said you were about to put it out the door.

CHAIRMAN STETKAR: Joy, this is a Subcommittee briefing. This has no --

MEMBER REMPE: Right, so it's not

official. I understand.

CHAIRMAN STETKAR: -- bearing on anything.

MEMBER REMPE: But there are some things that are just typos.

CHAIRMAN STETKAR: I'm going to go around the table later and ask whether or not we should bring this to the Full Committee, but --

MEMBER REMPE: Okay.

CHAIRMAN STETKAR: -- that's a different issue.

MEMBER REMPE: But what I'm just asking him in his mind -- what is your thought of when this would come back to ACRS?

MR. HARRISON: My mind is that we're going to go out for a 45-day public comment period. We're going to get comments on some of these items, I know. Some of the stuff I've heard today, I plan to reflect on that. And while I'm updating for the public comment period, I'm going to try to address those as well.

So I would foresee some of these like that last one of going back and talking with Lynn and her staff about how critical really is it that to say think about inter-system common-cause

failures? Is it really that significant given these designs? Do you want to just accept and say, no, for Capability I, II you don't have to do this? And then keep an eye, maybe write a note that says if you really see this, we should maybe have the staff ask a question as opposed to being an expectation.

So I plan on kind of taking the conversation here and tweaking --

MEMBER REMPE: Before it goes out for public comment, or after?

MR. HARRISON: No, after.

MEMBER REMPE: Okay.

MR. HARRISON: Because it's already kind of heading out the door.

MEMBER REMPE: That's what it sounded like, yes.

MS. MROWCA: And again, thank you for your thoughtful questions and comments, because those kind of things can be brought up in the public venue whenever we have our meeting as here's some additional suggestions that we might have to change what's here. What do you think?

MR. HARRISON: This is closed because we didn't get out the FRN to make it public, to

make an open meeting. Right. So we've been pushing --

(Simultaneous speaking)

CHAIRMAN STETKAR: Well, and also the documents that we got were stamped "official use only, pre-decisional."

MR. HARRISON: Yes.

CHAIRMAN STETKAR: So therefore, in principle if anything had changed from those documents to today, that's all we had available. So any comments that we would have made --

MR. HARRISON: And the only comment was; and you quoted it, is there's 86 times I use a phrase related to the word "expect." Sixty-some of those got changed.

CHAIRMAN STETKAR: Okay.

MR. HARRISON: Where we deleted the word "expect." And if it said the staff expects you to do X, we just said you should do X.

CHAIRMAN STETKAR: Oh, okay.

MEMBER BALLINGER: So you're saying that -- are you or are you not going to reflect on what's happened today and have that reflected in the document that goes out for public comment or not?

MR. HARRISON: No.

CHAIRMAN STETKAR: Essentially I think what Donnie is saying is this exchange here among one, two, three, four, five individuals; not the ACRS, is effectively part of the public comments.

MR. HARRISON: That's how we're going to treat it, yes.

MEMBER BALLINGER: Oh, okay.

MR. HARRISON: Yes.

MEMBER BALLINGER: Okay.

CHAIRMAN STETKAR: We are in this forum individuals who are members of the public and not the ACRS.

MR. HARRISON: And I'm not going to make you actually write down comments. Again, we heard the conversation --

CHAIRMAN STETKAR: Well, you're on a transcript, so you --

MR. HARRISON: Yes. But the intent is to do that, is to go back, take what we've heard, fix those things, reflect on them in the context of the other 45-day public comment period. Because like I said, the 10 to the minus 5 number, I've already been told informally people don't like that the screening criteria. So we're going to get

comment on it. This will go in with that pile.

CHAIRMAN STETKAR: This, by the way, isn't particularly unusual. I mean, we've done this before with Reg Guides and things like that where we've had a Subcommittee meeting to give the staff feedback on a draft Reg Guide that was on its way out for public comments. But because of the schedule -- it was the time. Our schedule, their schedule. It was inability at the Subcommittee level, at least, to get feedback. And then typically what we've done with Reg Guides is wait until they come back from public comments, see how the staff addresses the public comments, see how the staff has addressed Subcommittee members' comments and then make a determination of whether we want to have another Subcommittee meeting for the final draft of the Reg Guide or take it to the Full Committee maybe in that sense. And this is somewhat similar to that process.

MS. MROWCA: And there will be more chances for interaction, because once this gets published, then eventually it's going to be incorporated into Reg Guide 1.200, Rev 3. And the standard, if it goes out, it's going to be for trial use for probably three years. So this ISG is

probably going to stand for at least three years before --

(Simultaneous speaking)

CHAIRMAN STETKAR: Yes. Well, but see, that's the concern, is that if the ACRS next sees it at the Reg Guide or SRP or standard -- we don't see standards, but either the Reg Guide or the SRP, the ISG by that time has developed a very, very robust life of its own. At that point it's very, very difficult to head things down a different track, which is the problem we've had with a lot of the ISGs, quite frankly. So, yes, we would have another opportunity, but it isn't the same type of dynamic interaction.

MS. MROWCA: Yes, it's pretty rare to revise ISGs, even though it has been done --

CHAIRMAN STETKAR: No, it has been done.

MS. MROWCA: -- but not too often.

CHAIRMAN STETKAR: Not too often, but -- okay.

MS. DRUID: Right, but the intent, when Lynn says it's going to be incorporated into the Reg Guide 1.200, we've made it very clear to the public that this ISG will ultimately be withdrawn

or sunset
-- I don't know what is the right word -- withdrawn because once we issue Reg Guide 1.200, this goes away. Now there will be opportunity at that point because we will be taking lessons learned from the ISG. The standard will be out for trial use. So there will be I would say at least two, maybe three opportunities to further refine our position on all of these requirements.

CHAIRMAN STETKAR: Anything else from the staff?

MR. HARRISON: I'm packing up.

CHAIRMAN STETKAR: I see you doing that.

(Laughter)

CHAIRMAN STETKAR: What I'd like to do is, as we always do in the Subcommittee meeting, is go around the table and see if any of the members have any final comments or questions. And in addition to that, ask you whether you think there's any motivation to bring the ISG at the current time to the Full Committee. Joy?

MEMBER REMPE: Okay. Well, I came here to learn and I think I met my objective, not only from the presentation, but the discussion and items

brought up from my colleagues and ACRS and your responses back to them. And so I appreciated that exchange.

With respect to your question, again, even though I've been on ACRS and starting on my second term in October, I think from what I know it's better to wait until it comes back from public comment and see how you've updated it before it would come to ACRS.

CHAIRMAN STETKAR: Ron?

MEMBER BALLINGER: I'm still learning, and I'm learning a lot. If it was brought to the Full Committee, the Full Committee's comments would then be considered public comments, is that correct??

CHAIRMAN STETKAR: The ACRS is the ACRS, so if we bring it to the Full Committee for a briefing of the ACRS, that's a briefing of the ACRS. The Committee then can decide whether or not there's anything that's important enough for the Committee to write a letter, at which point it becomes an ACRS position.

MEMBER BALLINGER: Right, but the Committee would then not supply any additional feedback? That would be considered public comments

like this --

(Simultaneous speaking)

CHAIRMAN STETKAR: The ACRS meeting would be public, because that's what we do.

MEMBER BALLINGER: Okay.

CHAIRMAN STETKAR: So anything that is mentioned at that meeting would be on the public record, but it is not an ACRS position.

MEMBER BALLINGER: Right. Right.

CHAIRMAN STETKAR: It's simply 14 of us rather than 5 of us sitting in a room asking perhaps repetitiously some of the same questions or additional questions.

MEMBER BLEY: And the public comment period would have been closed at that point.

MEMBER BALLINGER: Oh, it would have been closed?

MEMBER BLEY: Yes, because they will have looked at the public comment.

MEMBER BALLINGER: Okay. That was my next question. Okay.

CHAIRMAN STETKAR: Well, if it goes --

(Simultaneous speaking)

MEMBER BLEY: Well, but if we go like tomorrow --

CHAIRMAN STETKAR: Yes, I mean, if we brought it to the Full Committee in November, for example. In that context it's as I described. It would be either out for public comments or, in its current form, draft ISG.

MEMBER BALLINGER: So it wouldn't do us any good --

MEMBER SCHULTZ: In its current form.

MEMBER BALLINGER: -- because no additional feedback would be provided they could use?

MEMBER SCHULTZ: It depends what the Full Committee would say.

CHAIRMAN STETKAR: It depends on what the Full Committee decides to say. If the Full Committee decided there were one or more issues that merited the Committee's feedback to the EDO in a formal letter form, then that would happen and that would be --

(Simultaneous speaking)

CHAIRMAN STETKAR: -- responses to those letters.

MEMBER BALLINGER: In that case I'd defer to you guys, because you're the experts.

CHAIRMAN STETKAR: Okay. Anything

else? Steve?

MEMBER SCHULTZ: Let me address the second part first: I think the best timing would be after the public comment period and after the staff has determined how they're going to respond to public comments, that we have another Subcommittee and follow that with a Full Committee meeting. Because I think that's the time that the Full Committee comment would carry weight at the right time to help the staff move this forward, not only internally, but externally.

And the second part is thank you so much for the presentation. I think this certainly represents good work by the staff to pull something together that based on our experience, my experience of how we want to place it is really needed to help provide guidance both the staff and to the applicants to reset, if you will, what is expected with regard to the performance PRAs at these various stages. So I think it's a good piece of work. And some tweaks are needed.

But I'm also very interested to get -- the reason I stated the sequence the way I did is I'm very interested to see what the public comments will be in certain particular areas and I'm not

sure that the Full Committee could -- I'm sure they would have comments certainly, but I think again hearing the public comments and seeing how the staff is intending to resolve them, that would be the right timing for us to weigh in as the Full Committee.

CHAIRMAN STETKAR: Thanks. Dennis?

MEMBER BLEY: I agree with Steve and Joy on the timing and that it's probably a good idea for us to take a look. I'd like to thank the staff for bringing this to us at this time. And I'd echo Steve in that given some of the things we saw in looking at design cert PRAs and associated Chapter 19s, we probably need this.

CHAIRMAN STETKAR: Thanks. And I'll weigh into that. I don't think that there is a need to bring it to the Full Committee, especially before public comments. I do think that despite the fact that it's Interim Staff Guidance that it does have -- we can't anticipate the number of design certifications that may be coming in in the next X number of years, where X is greater than 1 and less than n, whatever the Reg Guide and the -- will be updated. And that's not our -- we don't try to foresee that.

So I think that this Interim Staff Guidance is pretty important in terms of how potential applicants, either SMRs or other large plants, will organize the risk assessment part of the application. So in that sense, depending on what happens after the public comments, the Full Committee may or may not -- but I agree, I think we should have another Subcommittee meeting after public comments and you've had a chance to address them, and then take it from there as far as where we go with it.

Regarding an overall -- despite my whining and stuff, I think that you did a lot of really good work with this to clarify things, to address, as Dennis said, areas that we've seen not only deficiencies, but extreme variability in the applications. This --

(Simultaneous speaking)

MEMBER BLEY: -- confusion, yes.

CHAIRMAN STETKAR: Yes. Well, my interpretation versus your interpretation and neither of them necessarily being what the staff originally expected. So I think it's going to help an awful lot there. And I really do appreciate the amount of time and effort you put into pull all of

this stuff together for a four-hour presentation this afternoon, because there's a ton of stuff there.

And, Donnie, if you have every one of those supporting requirements memorized, you're a sick puppy.

(Laughter)

CHAIRMAN STETKAR: And with that, if there are no other comments, the meeting is adjourned.

(Whereupon, the above-entitled matter went off the record at 5:16 p.m.)

Assessing the Technical Adequacy of the Advanced Light-Water Reactor Probabilistic Risk Assessment for the Design Certification Application and Combined License Application

DC/COL-ISG-028

Draft for Public Comment

Presentation Outline

- Purpose, Scope, and Background
- General Topics of DC/COL PRA Standard Usage
- SR-by-SR Evaluation Process
  - Examples
- DC/COL Technical Challenges for PRA
  - Examples

Purpose of ISG

Provide consistent consideration of the PRA Standard in assessing the technical adequacy of the PRA needed for the Part 52 DC/COL applications

- Supplements RG 1.200, which currently endorses the PRA Standard (ASME/ANS RA-Sa-2009)
- Expect to incorporate into RG 1.200, RG 1.206, and SRP 19.0, as appropriate
  - Following issuance of next Edition of PRA Standard (expected Fall 2016)

Similar, but broader, effort being developed by ASME/ANS PRA Standard ALWR project team

Scope of ISG

Use for PRA required for:

- DC Application per 10 CFR 52.47(a)(27)
- COL Application per 10 CFR 52.79(a)(46) & (d)(1)

Not for PRA required for:

- COL Holders/Licensees per 10 CFR 50.71(h)
  - PRA required by fuel load and beyond
- Risk-Informed Applications
  - ISI, TS, ILRT, etc.
- These PRAs should address the endorsed ASME/ANS PRA Standard, as appropriate for the application

Only addresses typical conditions for DC/COL applications

Background

PRA Standard (ASME/ANS RA-Sa-2009) endorsed in RG 1.200, Revision 2

- Developed based on current operating reactors
- Does not specifically address:
  - ALWRs, pre-operational phases (e.g., Part 52 licensing), and Large Release Frequency (LRF)
- Establishes high-level requirements (HLRs) and individual supporting requirements (SRs) for the "What" (aspects) of PRA; not the "How" (methods, approaches) of PRA

General Topics of DC/COL Usage of PRA Standard

- Scope and Capability of PRA
- PRA Configuration Control
- Peer Reviews/Self Assessments
- Operational Guidance and Practices
- Large Release Frequency
- DC/COL Technical Challenges for PRA

DC/COL Technical Challenges

- Site-Specific Features and Characteristics
- Screening Events/Hazards for Analysis
- Plant-Specific Layouts and Capabilities
- Plant-Specific Operating Experience and Data
- Plant-Specific Guidance
- Interviews
- Walkdowns
- Treatment of Uncertainties

Scope and Capability of PRA

SRP 19.0: DC/COL PRA generally acceptable if meet HLRs and applicable SRs at Capability Category I (CC-I)

- Some SRs do not identify an action at CC-I
  - May be conservative or non-conservative
  - Evaluated for appropriate CC (I or II or III)
- Part 7 (Winds) and Part 8 (External Floods) should use Part 9 (Other Hazards) for CC-I
- Part 10 (Seismic Margins Analysis [SMA]) not endorsed by RG 1.200
  - Seismic analysis should follow PRA-Based SMA approach outlined in DC/COL-ISG-020 and SRP 19.0

PRA Configuration Control

DC/COL should have a PRA configuration control program consistent with the PRA Standard

- Reference to “as-built” and “as-operated” should be interpreted “as-to-be-built” and “as-to-be-operated”
- Should include guidance on when PRA needs to be updated/upgraded
  - Specifically should include guidance on addressing design/plant conditions that differ from PRA model

Peer Reviews/Self Assessments

SRP 19.0: DC/COL must justify adequacy of PRA (scope, level of detail, and technical acceptability)

- DC/COL may not be able to fully meet definition of peer review, but could still have independent review
  - May not have detailed knowledge of all aspects of the design, but should have some knowledge of design and operational philosophy
  - Review team documentation should identify the team's review limitations due to design and operations information and familiarity

Operational Guidance & Practices

Many SRs refer explicitly to using plant-specific procedures and practices since the PRA Standard was developed for current operating reactors and the guidance/practices already existed

- DC/COL may not have plant-specific procedures or established specific operating practices
- PRA should be based on available information regarding design, operating guidance, and typical industry good practices
- Document assumptions and potential impacts on PRA uses/risk-informed applications

Large Release Frequency

PRA Standard uses Large Early Release Frequency (LERF), which is a risk acceptance guideline for risk-informed applications (RG 1.174)

- DC/COL address Large Release Frequency (LRF)
- The PRA Standard HLRs and SRs for developing a LERF model would be essentially the same for developing a LRF model
- DC/COL should use the current HLRs and SRs replacing LERF with LRF

SR-by-SR Evaluation Process

Approach

- Evaluate applicability of SR to DC or COL application stage
- Evaluate feasibility of meeting SR at CC-I for DC or COL application stage
  - Determine if clarification is needed or additional guidance is needed

Potential SR Evaluation Outcomes

Can Meet

- Feasible to meet SR
- May need to clarify SR to be applicable to the DC/COL application stages

Cannot Meet

- Not feasible to meet SR
- May need to clarify SR to provide what should be performed

Not Applicable

- SR is not appropriate for use by ALWR or SR is conditioned on an activity or input that does not exist or is not performed
- May need to clarify SR to provide what should be performed

Replace

- SR is not appropriate for use by ALWR and needs to be replaced with a different requirement

Enhance

- SR needs to be enhanced to specifically address the DC/COL application stages

New

- There is no SR that addresses the needed requirement for the DC/COL application stages and a new SR needs to be provided

Can Meet

(No Clarification Needed)

Straight-forward reading of SR is applicable and feasible to DC/COL application stages

Example

AS-A6

Where practical, sequentially ORDER the events representing the response of the systems and operator actions according to the timing of the event as it occurs in the accident progression. Where not practical, PROVIDE the rationale used for the ordering.

Can Meet
(Clarification Needed)

SR is applicable and feasible for the DC/COL application stages to meet, with some clarification for a specific aspect of the SR

Example

IE-A5

Perform a systematic evaluation of each system, including support systems, to assess the possibility of an initiating event occurring due to a failure of the system. PERFORM a qualitative review of system impacts to identify potential system initiating events.

Clarification: DC may make assumptions regarding the design of some support systems (e.g., service water) through the impact of the loss of the system (or train of the system). COL can directly address the site-specific support system design.

Cannot Meet
(No Clarification Needed)

SR is not feasible for DC/COL application stages and no action is needed to be performed

Example

IFQU-A11

CONDUCT walkdown(s) to verify the accuracy of information obtained from plant information sources and to obtain or verify inputs to

(a) engineering analyses

(b) human reliability analyses

(c) spray or other applicable impact assessments

(d) screening decisions

Cannot Meet
(Clarification Needed)

SR is not feasible for DC/COL application stage, but some action should be performed

Example

ES-B1

IDENTIFY Fire Safe Shutdown/Appendix R equipment to be credited in the Fire PRA

Clarification: DC/COL may not have established fire safe shutdown/Appendix R equipment list. However, the DC/COL can identify mitigating equipment in addition to this source, such as the equipment identified in the internal events PRA.

Not Applicable
(Not Appropriate for Use)

Example

IFSN-A13

SCREEN OUT flood areas where flooding of the area does not cause an initiating event or a need for immediate plant shutdown, AND the following applies:

- The flood area contains flooding mitigation systems (e.g., drains or sump pumps) capable of preventing unacceptable flood levels, and the nature of the flood does not cause equipment failure (e.g., through spray, immersion, or other applicable failure mechanisms).

DO NOT CREDIT mitigation systems for screening out flood areas unless there is a definitive basis for crediting the capability and reliability of the flood mitigation system(s).

Comment: Given that drains can be plugged or covered and sump pumps can fail, this qualitative screening should not be used. Instead flood areas should quantitatively consider mitigation system performance and their potential for failure

Not Applicable
(Clarification Needed)

Example

PRM-B2

VERIFY the peer review exceptions and deficiencies for the Internal Events PRA are dispositioned, and the disposition does not adversely affect the development of the Fire PRA plant response model

Clarification: Though a formal peer review on the internal events PRA may not exist, findings and insights from internal and independent reviews should be performed and reviewed consistent with this SR

Not Applicable
(Conditioned on Another SR Not Performed)

Example

IGN-A6

When combining evidence from generic and plant-specific data, USE a Bayesian update process or equivalent statistical process. JUSTIFY the selection of any informative prior distribution used on the basis of industry experience.

- Since there is likely no plant-specific data available at these stages, Bayesian updating is not needed

REPLACE

SR is not appropriate for use by ALWR and needs to be replaced with a different requirement

- All are related to the screening of events/hazards
  - Due to significantly lower CDFs/LRFs, current screening criteria may eliminate hazards that are significant contributors to risk for new designs and screening based on the design-basis should not be used to screen a hazard
  - Consistent with RG 1.200 to lower screening criteria if overall risk is lower
  - Some SRs replaced to make hazards screening consistent (internally within Standard and with other guidance – NUREG-1855 revision); often refer to the replaced IE-C6

REPLACE **(IE-C6)**

Example

USE as screening criteria no higher than the following characteristics (or more stringent characteristics as devised by the analyst) to eliminate initiating events or groups from further evaluation:

(a) the frequency of the event is less than 1E-7 per reactor year (/ry), and the event does not involve either an ISLOCA, containment bypass, or reactor pressure vessel rupture

(b) the frequency of the event is less than 1E-6/ry, and core damage could not occur unless at least two trains of mitigating systems are failed independent of the initiator, or

(c) the resulting reactor shutdown is not an immediate occurrence. That is, the event does not require the plant to go to shutdown conditions until sufficient time has expired during which the initiating event conditions, with a high degree of certainty (based on supporting calculations), are detected and corrected before normal plant operation is curtailed (either administratively or automatically).

If either criterion (a) or (b) above is used, then CONFIRM that the value specified in the criterion meets the applicable requirements in Data Analysis (2-2.6) and Level 1 Quantification (2-2.7).

REPLACE (IE-C6) (continued)

Replace IE-C6:

USE the following screening criteria to eliminate initiating events or groups from further evaluation:

- the mean frequency of the initiating event is less than 1×10^{-6} per reactor year (/ry) and less than 10% of the internal events mean CDF and core damage could not occur unless at least two trains of mitigating systems are failed independent of the initiating event, or
- the mean frequency of the initiating event is less than 1×10^{-7}/ry and less than 1% of the internal events mean CDF and the initiating event does not involve or create an ISLOCA, containment bypass, containment failure, or direct core damage (e.g., reactor pressure vessel rupture), or
- the mean frequency of the initiating event results is less than 1×10^{-8}/ry, or
- The event does not result in a plant trip (manual or automatic) or a controlled manual shutdown. If credit is taken for operator actions to correct the condition to avoid a plant trip or controlled shutdown, then ENSURE the credited operator actions and associated equipment have an exceedingly low probability of failure (i.e., collectively less than or equal to 1×10^{-5}) following the applicable supporting requirements of this part (e.g., Human Reliability Analysis – subsection 2-2.5).

REPLACE (IE-C6) (continued)

- ENSURE that the value specified in the criterion meets the applicable requirements in the Data Analysis (subsection 2-2.6) and Level 1 Quantification (subsection 2-2.7).
- ENSURE that the mean cumulative contribution to CDF of the internal initiating events that have been screened out is less than 5% of the total mean CDF for internal events.
- ENSURE that the mean cumulative contribution to LRF of the internal initiating events that have been screened out is less than 5% of the total mean LRF for internal events.
- If additional screening criteria are applied, DEFINE the applied criteria and PROVIDE a basis that demonstrates internal initiating events that are screened out using the criteria are not significant contributors to internal events risk.

REPLACE **(EXT-C1)**

Example

For screening out an external hazard, any one of the following three screening criteria provides an acceptable basis for bounding analysis or demonstrably conservative analysis.

Criterion A: The current design-basis-hazard event cannot cause a core damage accident.

Criterion B: The current design-basis-hazard event has a mean frequency < 10^{-5}/yr, and the mean value of the conditional core damage probability (CCDP) is assessed to be < 10^{-1}.

Criterion C: The core damage frequency, calculated using a bounding or demonstrably conservative analysis, has a mean frequency < 10^{-6}/yr.

REPLACE **(EXT-C1)**

Replace EXT-C1

SCREEN OUT external hazards if

(a) the quantitative screening criteria in SR IE-C6 of Part 2, as applied to the external hazard, are met, OR

(b) the external hazard affects, directly and indirectly, only components in a single system, AND it can be shown that the product of the frequency of the external hazard and the probability of SSC failure given the hazard is two orders of magnitude lower than the product of the non-hazard (i.e., internal events) frequency for the corresponding initiating event in the PRA, AND the random (non–external hazard) failure probability of the same SSCs that are assumed failed by the external hazard.

If the external hazard impacts multiple systems, directly or indirectly, DO NOT screen on this basis.

ENHANCE

SR needs to be enhanced to specifically address the DC/COL stages

- Most expand existing SR related to documentation of uncertainty due to the reliance on more assumptions because of a lack of information and data
- Some expand existing screening of hazards

ENHANCE

Example

QNS-A1

DEFINE quantitative screening criteria that ensure that the cumulative impact of screened physical analysis units on CDF and LERF is small

Enhanced QNS-A1 to add:

Use supporting requirement IE-C6, of Part 2, as applied to fires, for screening fire areas

- The referenced SR, as replaced, contains language on ensuring the cumulative of the screened events/hazards are small (i.e., less than 5% of the hazard CDF)

NEW

There is no SR that addresses the needed requirement for the DC/COL stages and a new SR needs to be provided

- Almost all relate to documentation for Internal Fires (Part 4)
  - 1 new SR for External Hazards (Part 6)
- All related to documentation of uncertainty due to the reliance on more assumptions because of a lack of information and data
- Numerous other Parts also have this addition, but as an Enhancement to an existing SR

NEW

Examples

New CS-C5

DOCUMENT the sources of model uncertainty and related assumptions due to the status of design, site, operational, and maintenance information and data

New FSS-H10

DOCUMENT the limitations, and bases, due to the status of the design, site, operational, and maintenance information or data associated with the analyses as documented in FSS-H1 through H8 that would impact applications

DC/COL Technical Challenges

- Site-Specific Features and Characteristics
- Screening Events/Hazards for Analysis
- Plant-Specific Layouts and Capabilities
- Plant-Specific Operating Experience and Data
- Plant-Specific Guidance
- Interviews
- Walkdowns
- Treatment of Uncertainties

Site-Specific Features & Characteristics

Some SRs require site-specific information

- DC applications will not have site-specific information
  - Mainly affects ultimate heat sink features (service water) and external hazards analysis (seismic performed per PRA-based SMA guidance)
  - DC can make assumptions regarding capability of some plant features (e.g., service water)
  - DC will establish site characteristics/site interface requirements to base external hazards analysis
  - Cannot ensure assumed site characteristics address all credible hazards/sources for a site
- COL applications have site-specific information
  - COL can directly address SRs that require site-specific information

  OR
  - COL can confirm DC hazard analysis bounds site/regional characteristics

Site-Specific Features & Characteristics

Examples: DC Cannot Meet SR

SHA-I

A screening analysis shall be performed to assess whether, in addition to the vibratory ground motion, other seismic hazards, such as fault displacement, landslide, soil liquefaction, or soil settlement, need to be included in the seismic PRA for the specific application. If so, the seismic PRA shall address the effect of these hazards through assessment of the frequency of hazard occurrence or the magnitude of hazard consequences, or both

EXT-A2

SUPPLEMENT the list considered in (EXT-A1 [typical reference sources for external hazards to consider for PRA]) with any site-specific and plant-unique external hazards

Screening Events/Hazards for Analysis

New reactor designs typically have a lower CDF/LRF than current operating reactors

- RG 1.200: Screening should be adjusted according to the relative baseline risk value
- For DC/COL some SRs are evaluated to be Not Applicable, Replace, or Enhance to ensure potentially significant contributors are not screened out

Also being addressed generally for next Edition of PRA Standard

Screening Events/Hazards for Analysis

Example: SR Not Applicable for DC/COL

EXT-B2

Second Preliminary Screening: For screening out an external hazard other than seismic events, the following screening criterion provides an acceptable basis. The criterion is that the design basis for the event meets the criteria in the U.S. Nuclear Regulatory Commission 1975 Standard Review Plan

- Screening based on meeting the SRP design criteria does not address the potential entire spectrum of the hazard nor address potential failures at less than the design basis and this SR should not be used

Plant-Specific Layouts and Capabilities

DC/COL may not have established the specific cable routing or equipment locations/layouts

- DC/COL will likely use design, operational guidance, general engineering practices, and “exclusion” approaches (allowed by CS-A11 and FSS-A3)
- Mainly related to fire PRA

Plant-Specific Layouts and Capabilities
Example: DC/COL Cannot Meet SR

CS-A5

INCLUDE cable conductor-to-ground and conductor-to-conductor shorts (both intracable and intercable) as potential cable and circuit failure modes.

- Specific cable and circuit information will likely not be available and specific failure modes will not be modeled as the exclusion approach consistent with CS-A11 will be used

CS-A11

If assumed cable routing used in the Fire PRA, IDENTIFY the scope and extent, and PROVIDE a basis for the assumed cable routing.

Plant-Specific Operating Experience & Data

DC/COL will not have plant-specific operating experience and plant-specific equipment failure data upon which to base component failure rates and maintenance, surveillance, testing, and train alignment frequencies

- DC/COL should typically use component generic failure data and general operating practices and document assumptions

Plant-Specific Operating Experience and Data
Example: DC/COL Cannot Meet SR

SY-A19

In the systems model, INCLUDE out-of-service unavailability for components in the system model, unless screened, in a manner consistent with the actual practices and history of the plant for removing equipment from service.

(a) INCLUDE

(1) unavailability caused by testing when a component or system train is reconfigured from its required accident mitigating position such that the component cannot function as required

(2) maintenance events at the train level when procedures require isolating the entire train for maintenance

(3) maintenance events at a sub-train level (i.e., between tagout boundaries, such as a functional equipment group) when directed by procedures

…….

- DC/COL cannot meet SR, but should use general operating practices and document assumptions

Plant-Specific Guidance

Many SRs refer explicitly to using plant-specific procedures and practices since the PRA Standard was developed for current operating reactors and the guidance/practices already existed

- DC/COL may not have plant-specific procedures or established specific operating practices
- PRA should be based on available information regarding design, operating guidance, and typical industry good practices
- Document assumptions and potential impacts on PRA uses/risk-informed applications

Plant-Specific Guidance
Examples: DC/COL Can Meet SR

AS-A5

DEFINE the accident sequence model in a manner that is consistent with the plant-specific: system design, EOPs, abnormal procedures, and plant transient response

HR-A1

For equipment modeled in the PRA, IDENTIFY, through a review of procedures and practices, those test, inspection, and maintenance activities that require realignment of equipment outside its normal operational or standby status

- DC/COL should use general design and operational guidance information available for that stage

Interviews

Some SRs require interviews of or reviews by operations and training personnel, such as to ensure the PRA reflects actual operations and training practices

- Operations and training personnel with plant-specific experience may not exist
- Plant-Specific procedures may also not exist
- DC/COL PRA should be based on design and guidance documents

Interviews
Example: DC/COL Can Meet SR

SY-A4

CONFIRM that the system analysis correctly reflects the as-built, as-operated plant through discussions with knowledgeable plant personnel (e.g., engineering, plant operations, etc.)

- This SR can be achieved through interviews of knowledgeable design personnel based on the expected as-to-be-built, as-to-be-operated plant

Walkdowns

Walkdowns

- DC cannot walkdown a site to collect information or verify PRA model properly reflects the site and DC/COL cannot walkdown design features to verify PRA model properly reflects the plant systems and features

Walkdowns

Examples: DC or COL Cannot Meet SR

EXT-D1

CONFIRM the basis for the screening out of an external hazard through a walkdown of the plant and its surrounding

IFPP-A5

CONDUCT plant walkdown(s) to verify the accuracy of information obtained from plant information sources and to obtain or verify

(a) spatial information needed for the development of flood areas

(b) plant design features credited in defining flood areas

Treatment of Uncertainties

DC/COL will have increased uncertainty and reliance on more assumptions due to the status of site, design, operational, and maintenance information and data

- Enhanced many SRs (and created some new SRs) related to documenting limitation and impacts on risk-informed applications and characterizing sources of model uncertainty due to this uncertainty

Treatment of Uncertainties
Example: DC/COL SR Enhanced

WHA-B1

DOCUMENT the wind hazard analysis manner that facilitates PRA applications, upgrades, and peer review

- Added: DOCUMENT the limitations, and bases, due to the status of the design, site, operational, and maintenance information or data that would impact applications

WHA-B3

DOCUMENT the sources of model uncertainty and related assumptions associated with the wind hazard analysis.

- Added: DOCUMENT the sources of model uncertainty and related assumptions due to the status of the design, site, operational, and maintenance information and data

Next Steps

- Issuance of draft ISG for public comment pending
  - 45-day public comment period
- In parallel, engaging ASME/ANS PRA Standards working group on potential for developing similar product as an appendix
  - Focus may be on Capability Category II and/or develop expected state-of-practice for DC/COL
  - May include guidance for the PRA required by Fuel Load and the early operational period

Acronyms

ALWR	Advanced Light-Water Reactor
ANS	American Nuclear Society
ASME	American Society for Mechanical Engineers
CC	Capability Category
CCDP	Conditional Core Damage Probability
CDF	Core Damage Frequency
COL	Combined License
DC	Design Certification
HLR	High Level Requirement
ISG	Interim Staff Guidance
ISLOCA	Interfacing Systems Loss of Coolant Accident
LERF	Large Early Release Frequency
LRF	Large Release Frequency
PRA	Probabilistic Risk Assessment
RG	Regulatory Guide
SMA	Seismic Margins Analysis
SR	Supporting Requirement
SRP	Standard Review Plan
SSC	Structures, Systems, and Components