

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
 Reliability and Probabilistic Risk Assessment
 Closed Session

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Monday, September 15, 2014

Work Order No.: NRC-1083

Pages 1-266

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UNITED STATES OF AMERICA

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

+ + + + +

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

1 DESIGNATED FEDERAL OFFICIAL:

2 HOSSEIN NOURBAKHS

3

4 STAFF PRESENT:

5 MARY DROUIN

6 DONNIE HARRISON

7 HANH PHAN

8 LYNN MROWCA

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

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assessing the technical adequacy of the
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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

1 statements?

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

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

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

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

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

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

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

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

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

25 MS. DROUIN: There is a lot of history

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

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

20 Our resources, which are very limited,
21 are going to be focused on the standard that's out
22 there for operating reactors and trying to get all
23 the different hazards there covered from a level 1
24 for internal events, flood, fire, seismic, a level
25 2; that was more than enough work, and to look at

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

3 I'm hesitant to say stuff here in a
4 certain way. I'm trying to -- because I don't want
5 to impugn ASME and ANS on some of their decisions
6 that were made that the NRC wasn't exactly
7 supportive of.

 MEMBER SCHULTZ: Perhaps I
8 can ask a follow-on question that might at least
9 clarify it for today's discussion. I haven't read
10 it either, or looked at it. If we did, is it
11 developed? Is that standard developed in such a
12 fashion as is being done here; that is, taking the
13 current approach and augmenting or amending it so
14 that it's applicable to a different set of advanced
15 reactors or is it a brand new approach it's taken?

 MS. DROUIN: It does have new stuff in
16 it in that it is written as a single continuous
17 standard in the sense that there's no demarcation
18 in that standard between the level 1 and level 2,
19 and a level 2 and a level 3. So it takes you from
20 your initiator all the way out to your fatalities.
21 But to review a standard; at least in the way we
22 have to review it at the NRC, is not a trivial
23 effort. It's a lot of resources to review a
24 standard. And this is a 500-some-page standard,
25

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

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

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

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

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

18 (Simultaneous speaking)

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

21 MR. HARRISON: Yes, before operations.

22 MS. DROUIN: Right.

23 CHAIRMAN STETKAR: I count three
24 standards.

25 MS. DROUIN: Okay. The LWR for design

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

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

5 MS. DROUIN: It's an appendix.

6 CHAIRMAN STETKAR: Okay.

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

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

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

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

17 MS. DROUIN: Yes.

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

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

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

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

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

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

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

6 MR. HARRISON: Right.

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

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

21 MS. DROUIN: In the level 2 part --

22 MEMBER BLEY: Yes.

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

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

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

5 MS. DROUIN: Yes.

6 MEMBER BLEY: Not just non-LWR, yes.

7 MS. DROUIN: That is accurate.

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

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

13 MEMBER BLEY: Yes.

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

17 MEMBER BLEY: Yes.

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

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

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

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

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

6 CHAIRMAN STETKAR: Thanks.

7 MR. HARRISON: A good intro to the
8 presentation?

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

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

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

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

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

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

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

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

16 MEMBER BLEY: Why would you put it in
17 1.206? 1.206 is programmatic stuff mostly, isn't
18 it?

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

23 MEMBER BLEY: Oh.

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

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

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

7 (Simultaneous speaking)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

16 MEMBER BLEY: Yes.

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

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

25 MS. MROWCA: Yes, the design-specific

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

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

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

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

20 MR. HARRISON: There's a whole --

21 MEMBER BLEY: Have you ever thought
22 about that?

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

24 MEMBER BLEY: I hear rumpblers that some
25 might, you know?

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

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

11 MR. HARRISON: Yes.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9 MR. HARRISON: Oh, there you go. Thank
10 you. So there's a Capability I, II or III that a
11 person could use in categorizing. You'll see a
12 number of these go across all three. That means
13 you just meet that requirement or you don't meet
14 it. You don't really get a -- you're not supposed
15 to say you get a great for that, but you'll hear
16 say I meet Capability Category III. What that
17 really means is they met the requirement. Those
18 are just -- you have to do those. And an example
19 of that would be like A-2 there where it says "for
20 each model to initiate an event, identify the key
21 safety functions that are necessary to reach a safe
22 stable state and prevent core damage," which is a -
23 -

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

25 CHAIRMAN STETKAR: I can say this

1 because we are not on the public record here.

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

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

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

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

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

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

21 MR. HARRISON: And I hear --

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

25 MR. HARRISON: And we're aware of about

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

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

5 MR. HARRISON: It's about 40.

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

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

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

12 (Simultaneous speaking)

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

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

17 MR. HARRISON: Right.

18 CHAIRMAN STETKAR: -- treatment of
19 data.

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

23 CHAIRMAN STETKAR: Yes.

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

1 floods.

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

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

20 CHAIRMAN STETKAR: Right.

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

24 CHAIRMAN STETKAR: Sure. That's right.

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

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

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

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

25 And I stepped in. The NRC stepped in

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

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

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

1 I and II, no requirement for time trend analysis.
2 Right? So if someone comes in and says I meet
3 Capability III, well, that was the only capability
4 category you could meet. Doing nothing got you I
5 and II. Right? So if someone comes in and says
6 it, now here's the funny part: When you read
7 Capability III, "Use Time Trend Analysis," and you
8 get all the way down, "Acceptable Methodologies for
9 Time Trend Analysis" can be found in NUREG-5750,
10 6928. Those are generic data sources.

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

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

17 CHAIRMAN STETKAR: Is there?

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

1 like that and try to fix it.

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

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

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

20 MS. MROWCA: Oh.

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

23 MS. MROWCA: Okay.

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

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

13 (Simultaneous speaking)

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

1 MS. MROWCA: And important insight.

2 CHAIRMAN STETKAR: So can it have?

3 Yes, it can, because there's --

4 (Simultaneous speaking)

5 MEMBER BLEY: BLEY: And in fact --

6 (Simultaneous speaking)

7 CHAIRMAN STETKAR: Right.

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

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

13 MS. MROWCA: And so --

14 (Simultaneous speaking)

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

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

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

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

25 MR. HARRISON: You'd have to look at

1 it, yes.

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

4 MR. HARRISON: Yes, and --

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

10 MS. MROWCA: Yes.

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

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

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

25 (Laughter)

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

10 CHAIRMAN STETKAR: Yes, that's right.

11 MEMBER BLEY: In fact, they aren't.

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

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

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

24 MR. HARRISON: Right.

25 MEMBER BLEY: You kind of said, well,

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

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

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

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

6 MR. HARRISON: But I think on the --

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

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

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

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

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

5 MR. HARRISON: My personal --

6 MEMBER BLEY: Yes.

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

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

11 (Simultaneous speaking)

12 MR. HARRISON: But --

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

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

18 MEMBER BLEY: Yes.

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

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

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

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

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

21 MEMBER BLEY: Right.

22 (Laughter)

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

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

1 right.

2 (Laughter)

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

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

8 (Laughter)

9 CHAIRMAN STETKAR: Because you're
10 running the game.

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

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

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

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

4 CHAIRMAN STETKAR: This as a cookbook
5 now?

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

8 CHAIRMAN STETKAR: Okay. To meet LEC
9 2, I need to have an attorney interpret what
10 include conservative -- oh, conservative? I need
11 to have an interpretation of what that is versus
12 treatment of feasible. What is a feasible -- I
13 need to have an attorney. And as long as my
14 attorney interprets the fact that I am meeting
15 every word there, I check off the box by doing it.
16 Okay. Now, let's go to LEC-3.

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

19 CHAIRMAN STETKAR: But people are.

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

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

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

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

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

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

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

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

15 MR. HARRISON: Right.

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

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

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

21 MEMBER BLEY: I mean, is that true?

22 CHAIRMAN STETKAR: EPR becomes APWR
23 advanced light water --

24 MEMBER BLEY: Are advanced light water
25 reactors?

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

13 MEMBER BLEY: My question though was
14 about this ISG.

15 MS. MROWCA: Yes. Well, this ISG is
16 supposed to take the place of that standard until
17 it can hit the streets. So it's really also
18 focused on the pre-operational phases because Part
19 52 kind of gets you to that place where you can't
20 use the current standard for everything.

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

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

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

6 (Simultaneous speaking)

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

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

11 MR. HARRISON: Oh, okay.

12 (Laughter)

13 MR. HARRISON: Okay.

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

16 (Simultaneous speaking)

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

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

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

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

20 MR. HARRISON: I was hoping I was
21 close.

22 CHAIRMAN STETKAR: No --

23 (Simultaneous speaking)

24 MR. HARRISON: There you go. There you
25 go.

1 CHAIRMAN STETKAR: -- than you think.

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

13 (Laughter)

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

16 CHAIRMAN STETKAR: So what's your
17 opinion?

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

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

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

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

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

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

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

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

11 MR. HARRISON: Since I did --

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

14 "As noted in ASME/ANS RA-Sa-2009,
15 Section 7-2, the fact that the high wind events are
16 not screened out per the screening criteria in Part
17 6 (as modified by the comments provided previously
18 on Part 6), the supporting requirements in this
19 part typically correspond to Capability Category II
20 (i.e., Capability Category I would involve the
21 simplified and/or conservative screening approaches
22 identified in Part 6). As a result, many
23 supporting requirements in this part designate
24 Capability Category I as not defined. However,
25 consistent with the discussion in Part 9, Section

1 9-2 for other external hazards, it is acceptable to
2 introduce conservatisms in any step as long as the
3 impact on overall CDF and LRF is evaluated and the
4 associated uncertainty addressed. Where
5 simplifications and conservatisms are used, the
6 supporting requirement would be more appropriately
7 considered Capability Category I. Therefore, the
8 staff expects DC/COL applicants to develop high-
9 wind event PRAs if necessary considering the
10 parallel generic supporting requirements of Part 9
11 for achieving Capability Category I."

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

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

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

24 MR. HARRISON: I thought we corrected
25 that.

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

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

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

7 MR. HARRISON: Ah, not in your
8 original.

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

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

13 (Laughter)

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

16 CHAIRMAN STETKAR: Anyway, go on.

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

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

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

25 MR. HARRISON: Yes, and that's probably

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

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

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

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

12 MR. HARRISON: Okay.

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

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

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

25 MR. HARRISON: No.

1 CHAIRMAN STETKAR: You're not.

2 MR. HARRISON: I wasn't.

3 CHAIRMAN STETKAR: Okay. Well --

4 MR. HARRISON: As soon as we get --

5 CHAIRMAN STETKAR: -- time for more
6 whining.

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

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

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

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

6 MR. HARRISON: And that --

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

9 (Simultaneous speaking)

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

17 CHAIRMAN STETKAR: Sure.

18 MR. HARRISON: -- their function.

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

25 MEMBER BLEY: But even if you do --

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

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

15 CHAIRMAN STETKAR: I don't know --

16 (Simultaneous speaking)

17 CHAIRMAN STETKAR: Why do you talk
18 about it? Why is it necessary to -- the problem is
19 throughout the guidance then you constantly make
20 reference in every single line item to DC/COL ISG-
21 020, which is PRA-based seismic margins analysis
22 regardless of whether it's a DC or a COL. And I'd
23 like the staff to explain to me why at the COL
24 stage I cannot perform a seismic PRA.

25 MR. HARRISON: And that's an error.

1 It's --

2 CHAIRMAN STETKAR: What am I missing
3 that I need?

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

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

18 MR. HARRISON: Yes.

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

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

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

11 And I believe that what applicants for
12 the COL do is that they go in and they specify a
13 design-basis exceedance frequency such that I am
14 going to use a couple times 10 to the minus 4, or
15 maybe 10 to the minus 5 for my design-basis
16 exceedance frequency, go to each of their hazard
17 curves, pick off the G level at 0.5 hertz that
18 corresponds to the exceedance frequency of -- let's
19 pick a number -- 10 to the minus 4. That becomes a
20 point. That is their mean ground acceleration at
21 0.5 hertz at an exceedance frequency of 10 to the
22 minus 4 per year. And they do that for each hertz
23 and they plot now a ground motion response spectrum
24 that has implicit in it an exceedance frequency.

25 In my example it would be that is the

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

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

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

1 CHAIRMAN STETKAR: That is a curve.

2 That says I design the building --

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

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

8 MR. HARRISON: Yes.

9 CHAIRMAN STETKAR: That's all it is.

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

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

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

17 (Simultaneous speaking)

18 CHAIRMAN STETKAR: That's all right.

19 (Simultaneous speaking)

20 CHAIRMAN STETKAR: I had three points -
21 -

22 MR. HARRISON: Okay.

23 CHAIRMAN STETKAR: -- and HCLPFs is the
24 third.

25 MR. HARRISON: Okay. So those

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

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

18 MR. HARRISON: Right.

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

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

25 CHAIRMAN STETKAR: So my question is

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

10 MR. HARRISON: Yes.

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

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

16 CHAIRMAN STETKAR: Because, see, if I
17 read that, in a deterministic sense all it says to
18 me is somebody comes in and says, well, I did my
19 site-specific hazard analysis in Chapter 2. I have
20 my hazard curves. I derived a mean -- at some
21 implicit exceedance frequency a mean GMRS. I
22 compared it with the deterministic GMRS in Chapter
23 2 of the DCD and I'm bounded. I don't need to do
24 any more. I'm bounded. My hazard is bounded. My
25 site-specific hazard is completed bounded in a PRA

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

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

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

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

11 (Simultaneous speaking)

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

14 MR. HARRISON: Right. Yes.

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

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

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

7 CHAIRMAN STETKAR: Is it 10 to the --

8 MR. HARRISON: It was.

9 CHAIRMAN STETKAR: I plotted them and
10 some of them come out closer to 10 to the minus 5.
11 Some of them have been in kind of the middle, like
12 3 or 4 times to the 10 minus 5 range.

13 MR. HARRISON: Okay.

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

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

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

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

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

5 CHAIRMAN STETKAR: But it does have --

6 (Simultaneous speaking)

7 MR. HARRISON: -- 10 to the minus 5?

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

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

14 MR. HARRISON: I just can't recall.

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

18 MR. HARRISON: Yes.

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

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

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

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

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

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

6 CHAIRMAN STETKAR: I do.

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

10 CHAIRMAN STETKAR: Yes.

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

14 (Simultaneous speaking)

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

18 (Simultaneous speaking)

19 MEMBER BLEY: The hazard curve --

20 (Simultaneous speaking)

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

25 MEMBER BLEY: The hazard curve flattens

1 out, is the problem.

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

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

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

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

7 CHAIRMAN STETKAR: Right.

8 MR. HARRISON: -- derive the mean.

9 CHAIRMAN STETKAR: The mean hazard.
10 The mean fragility.

11 MR. HARRISON: The mean fragility
12 curves.

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

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

4 MR. HARRISON: Data.

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

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

16 CHAIRMAN STETKAR: Measure uncertainty.

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

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

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

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

9 (Simultaneous speaking)

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

16 MR. HARRISON: Discussion of HCLPF
17 failures.

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

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

1 as opposed to a --

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

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

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

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

23 CHAIRMAN STETKAR: Right.

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

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

5 CHAIRMAN STETKAR: Yes.

6 MEMBER BLEY: -- which we asked for.

7 CHAIRMAN STETKAR: Yes.

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

11 (Laughter)

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

14 CHAIRMAN STETKAR: Right.

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

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

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

1 ISG-020?

2 (Simultaneous speaking)

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

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

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

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

7 MS. MROWCA: And talk to our seismic
8 friends.

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

11 (Phone line tones)

12 CHAIRMAN STETKAR: That's troubling.

13 MEMBER BLEY: Since this is supposedly
14 a closed meeting.

15 MR. NOURBAKHS: It's closed.

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

18 (Phone line tones)

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

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

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

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

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

7 MS. MROWCA: Yes.

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

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

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

3 MR. HARRISON: No --

4 (Simultaneous speaking)

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

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

9 MS. MROWCA: I'll look it up.

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

12 (Simultaneous speaking)

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

17 MR. HARRISON: Right, that is correct.

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

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

24 (Simultaneous speaking)

25 CHAIRMAN STETKAR: Yes.

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

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

8 MR. HARRISON: It was.

9 CHAIRMAN STETKAR: -- Fukushima.

10 MR. HARRISON: Yes.

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

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

16 MR. HARRISON: Right.

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

19 MS. DRUID: Yes, very narrow.

20 MR. HARRISON: You could uses pieces of
21 it.

22 MS. DRUID: Very narrow.

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

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

3 MEMBER SCHULTZ: It was.

4 MR. HARRISON: Once we get to the --

5 (Simultaneous speaking)

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

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

9 CHAIRMAN STETKAR: It's going to get
10 easier.

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

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

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

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

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

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

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

14 (Simultaneous speaking)

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

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

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

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

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

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

25 And there again, potential impacts on

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

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

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

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

3 Large release frequency.

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

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

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

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

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

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

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

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

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

23 (Simultaneous speaking)

24 CHAIRMAN STETKAR: And in many cases
25 you say that.

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

7 CHAIRMAN STETKAR: That's true.

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

13 (Simultaneous speaking)

14 CHAIRMAN STETKAR: Expects the --

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

19 (Simultaneous speaking)

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

1 we have a different philosophy in our EOPs or
2 something.

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

7 CHAIRMAN STETKAR: Yes, one would hope.

8 MR. HARRISON: And some of this --

9 MEMBER SCHULTZ: I understand.

10 MR. HARRISON: And this may be a good
11 example where I missed something on it because I
12 was
13 -- the industry when they developed their draft
14 standard was looking at a -- they were replacing
15 this with go talk to the designers.

16 CHAIRMAN STETKAR: But that's --

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

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

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

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

15 MR. HARRISON: Right.

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

18 MR. HARRISON: Exactly.

19 CHAIRMAN STETKAR: -- is there
20 something here?

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

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

3 MR. HARRISON: Often I try to do that.

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

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

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

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

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

20 MR. HARRISON: Yes.

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

1 they could.

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

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

23 CHAIRMAN STETKAR: What a surprise.

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

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

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

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

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

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

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

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

13 CHAIRMAN STETKAR: Yes, this is --

14 MEMBER BLEY: Before you go --

15 CHAIRMAN STETKAR: Dr. Bley, yes?

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

1 nobody's doing it.

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

5 MEMBER SCHULTZ: Hear, hear.

6 MR. HARRISON: It should be caught.

7 (Simultaneous speaking)

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

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

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

18 MEMBER BLEY: That's at a high level.

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

21 (Simultaneous speaking)

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

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

3 MEMBER SCHULTZ: That's right.

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

6 MEMBER BLEY: And there shouldn't be.

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

21 CHAIRMAN STETKAR: Donnie, I just did -
22 -

23 (Simultaneous speaking)

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

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

14 MR. HARRISON: Restate what that
15 requirement is.

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

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

20 CHAIRMAN STETKAR: Huh?

21 MEMBER BALLINGER: I didn't read that.

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

25 CHAIRMAN STETKAR: Oh, I'm sorry. Wait

1 a minute. I'm probably confused.

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

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

7 (Simultaneous speaking)

8 PARTICIPANT: Non-LWR?

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

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

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

16 (Simultaneous speaking)

17 CHAIRMAN STETKAR: Those are good
18 words.

19 (Simultaneous speaking)

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

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

25 MEMBER BLEY: Are we on a break.

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

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

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

9 CHAIRMAN STETKAR: Anyway, let's --

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

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

15 (Laughter)

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

18 (Whereupon, the above-entitled matter
19 went off the record at 3:05 p.m. and resumed at
20 3:24 p.m.)

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

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

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

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

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

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

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

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

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

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

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

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

19 CHAIRMAN STETKAR: Do you have any
20 examples from fire?

21 MR. HARRISON: Yes, I do have --
22 (Simultaneous speaking)

23 CHAIRMAN STETKAR: You do? Okay. Go
24 on.

25 MR. HARRISON: I think I do.

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

3 MR. HARRISON: Okay.

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

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

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

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

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

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

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

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

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

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

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

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

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

20 MR. HARRISON: Ooh, okay.

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

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

25 MR. HARRISON: Okay.

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

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

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

19 MR. HARRISON: It's subtle.

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

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

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

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

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

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

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

3 MR. HARRISON: Yes.

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

16 MR. HARRISON: Correct.

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

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

1 all the equipment that should be put in the PRA.

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

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

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

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

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

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

22 MR. HARRISON: Yes, but --

23 (Simultaneous speaking)

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

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

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

15 MR. HARRISON: That's not the intent.

16 MEMBER BLEY: I know.

17 MR. HARRISON: If you look at the --

18 MEMBER BLEY: I'm asking --

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

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

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

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

11 (Simultaneous speaking)

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

21 MR. HARRISON: Right.

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

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

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

13 MEMBER BLEY: To me, we've got
14 something akin to what we had earlier talking about
15 going to the FSAR to get a preliminary idea of the
16 P&IDs and of the equipment important to safety and
17 all of that stuff. Maybe it's just you need some
18 language. It seems very reasonable to me to raise
19 this as something to look at, but within the
20 context of that's just the first place to begin to
21 gather information. But otherwise, we'd go back
22 and get rid of all the stuff about Chapter 15 and -
23 -

24 (Simultaneous speaking)

25 MS. DRUID: Just to defend Donnie a

1 little bit here --

2 MEMBER BLEY: I'm sorry?

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

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

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

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

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

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

14 (Simultaneous speaking)

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

17 MS. DRUID: Yes --

18 (Simultaneous speaking)

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

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

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

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

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

17 (Simultaneous speaking)

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

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

25 (Simultaneous speaking)

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

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

5 CHAIRMAN STETKAR: I understand some of
6 that.

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

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

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

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

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

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

1 internal events PRA. That's the intent there.

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

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

13 (Simultaneous speaking)

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

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

19 CHAIRMAN STETKAR: Is not defined?
20 Okay.

21 MR. HARRISON: That I recall.

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

24 MR. HARRISON: No.

25 MEMBER BLEY: No? Well, it went away.

1 There was something at one time.

2 MS. DRUID: No, there never --

3 MEMBER BLEY: Never was?

4 CHAIRMAN STETKAR: A couple of places.

5 This was one, and there is another one that because
6 of the time I'm not going to try to find. There
7 was almost an implicit incentive for somebody to
8 not do a review because if they did a review, the
9 guidance says, well -- the guidance now to the
10 staff says go look at that review and, my God, if
11 they found anything, go beat up the applicant.

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

14 (Simultaneous speaking)

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

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

25 CHAIRMAN STETKAR: Yes.

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

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

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

25 CHAIRMAN STETKAR: I haven't seen those

1 questions to date, but go on.

2 MR. HARRISON: But we did flip that
3 around.

4 CHAIRMAN STETKAR: In design reviews.

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

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

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

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

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

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

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

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

3 CHAIRMAN STETKAR: Why is hazard
4 screening in -- I don't remember anything in that -
5 -

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

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

11 CHAIRMAN STETKAR: Okay.

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

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

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

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

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

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

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

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

6 So the replacement one goes on for a
7 couple of pages and we've expanded. So we still
8 have that 10^{-6} one where you have at
9 least two trains of mitigating systems have to fail
10 independent, but we've also added in the phrase
11 "and less than 10 percent of the initiating events
12 mean CDF and core damage." So it not only has to
13 meet 10^{-6} , but it has to be less than
14 10 percent of the internal events core damage
15 frequency. So if you get a very low core damage
16 frequency for your plant, you may have to come back
17 and add in some things you thought you screened
18 out. You may have screened them at 10^{-6}
19 6. Now you have to put them back in because you're
20 below 10^{-7} . So this makes an
21 iteration process occur.

22 The same is on the 10^{-7}
23 frequency with an ISLOCA. We added a couple of
24 other things to make it clear. Containment bypass,
25 containment failure, direct core damage, for

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

11 We then added, if you will, an absolute
12 screen that says if the initiating event is below
13 10 to the minus 8, you can screen it.

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

16 MR. HARRISON: Yes.

17 CHAIRMAN STETKAR: -- value for large
18 release frequency?

19 MR. HARRISON: Effectively, yes.

20 CHAIRMAN STETKAR: Because that is --

21 (Simultaneous speaking)

22 MR. HARRISON: I can --

23 (Simultaneous speaking)

24 CHAIRMAN STETKAR: That's the meteorite
25 event?

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

6 We then enhance the thing about the
7 plant trip and shutdown and put in some specific
8 criteria, because when someone says high-reliable
9 action or high confidence that you will avoid a
10 plant trip, implicit in that is you're basically
11 saying it's guaranteed that we're going to take
12 care of the plant. So again, this is dealing item
13 8 originally where it's not an immediate occurrence
14 and I can take actions until sufficient time has
15 expired with a high degree of certainty. So we
16 went in and said if you're going to take credit for
17 operator actions to either condition or to avoid a
18 plant trip, or have a controlled shutdown, then
19 assure that the credited operator action is of an
20 exceedingly low probability. And again, we've
21 stuck in the number 10 to the minus 5 collectively.

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

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

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

10 CHAIRMAN STETKAR: By putting this
11 number in here?

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

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

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

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

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

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

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

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

6 CHAIRMAN STETKAR: Okay.

7 MR. HARRISON: That's the intent, is
8 that instead of telling me that you believe it's
9 highly reliable -- or tell me, show me the
10 quantification and what the actions are instead of
11 --

12 (Simultaneous speaking)

13 CHAIRMAN STETKAR: Yes.

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

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

24 MEMBER BLEY: Well, and --

25 CHAIRMAN STETKAR: Right?

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

9 CHAIRMAN STETKAR: Yes.

10 MR. HARRISON: -- on the words in the -
11 -

12 (Simultaneous speaking)

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

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

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

1 telling them they better have good justification
2 for it.

3 MR. HARRISON: Right.

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

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

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

21 MR. HARRISON: Oh, okay.

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

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

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

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

9 MEMBER SCHULTZ: I'd have to go look.

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

12 MEMBER SCHULTZ: Okay.

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

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

19 (Simultaneous speaking)

20 MR. HARRISON: Significant components.

21 CHAIRMAN STETKAR: Yes.

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

24 CHAIRMAN STETKAR: Okay.

25 MR. HARRISON: IT's a percentage of the

1 total.

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

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

6 MS. DRUID: Just real quick?

7 CHAIRMAN STETKAR: Okay.

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

10 (Simultaneous speaking)

11 MEMBER SCHULTZ: Apparently not. I
12 understand that.

13 MR. HARRISON: We got rid of it.

14 CHAIRMAN STETKAR: Which is good.

15 MEMBER SCHULTZ: Yes.

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

1 less than five percent of the total of your CDF.

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

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

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

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

1 think 95 percent.

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

5 MS. DRUID: And there you go.

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

16 MS. DRUID: Right, if you look at QU-B3
17 --

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

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

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

25 Another example where we replaced

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

13 (Laughter)

14 MR. HARRISON: Because by default
15 design-bases always have to succeed, right? Now
16 this is saying the hazard, so it's not the whole
17 sequence. But Criteria B, the current design-
18 basis-hazard event has a mean frequency less than
19 10 to the minus 5. If you notice, like we were
20 talking during the break, seismic hazards, design-
21 basis is usually somewhere around 10 to the minus
22 4. So it would be greater than that, so you
23 couldn't screen out seismic, but there's a lot of
24 tornados, other hazards that would be screened out
25 using that design-basis-hazard.

1 CHAIRMAN STETKAR: Really big tsunamis.

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

4 MR. HARRISON: One, yes.

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

6 MR. HARRISON: Yes.

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

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

11 MEMBER BLEY: Right.

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

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

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

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

13 (Laughter)

14 CHAIRMAN STETKAR: It makes if you
15 write the equation.

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

21 MEMBER SCHULTZ: I like that
22 explanation better.

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

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

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

13 CHAIRMAN STETKAR: Good.

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

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

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

24 CHAIRMAN STETKAR: Good.

25 MS. DRUID: Do they're working on this

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

6 MR. HARRISON: Okay.

7 CHAIRMAN STETKAR: I found the stuff in
8 1855, by the way. I'd just forgotten.

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

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

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

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

25 Sometimes instead of being new it was

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

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

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

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

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

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

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

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

9 MR. HARRISON: Bound.

10 CHAIRMAN STETKAR: I mean we --

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

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

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

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

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

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

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

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

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

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

25 MEMBER BLEY: When was WASH-1400

1 published?

2 MEMBER SCHULTZ: 1973, the first time.

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

4 -

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

7 MEMBER SCHULTZ: Yes, '75.

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

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

20 MR. HARRISON: Yes.

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

1 I just mention that.

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

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

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

16 MEMBER BLEY: Fair enough.

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

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

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

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

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

24 MR. HARRISON: Yes.

25 CHAIRMAN STETKAR: To meet Capability

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

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

8 CHAIRMAN STETKAR: Sixty-eight fifty.

9 MR. HARRISON: -- 6850.

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

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

15 CHAIRMAN STETKAR: No, it says up to
16 two.

17 MR. HARRISON: Up to two.

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

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

23 (Simultaneous speaking)

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

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

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

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

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

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

18 (Simultaneous speaking)

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

20 (Simultaneous speaking)

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

1 of multiple spurious operations in the NFP-805
2 world?

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

5 (Laughter)

6 MR. HARRISON: I can't remember.

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

9 (Laughter)

10 CHAIRMAN STETKAR: Go on.

11 MR. HARRISON: Okay.

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

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

16 (Simultaneous speaking)

17 CHAIRMAN STETKAR: Immediately in his
18 old job.

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

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

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

6 (Simultaneous speaking)

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

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

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

1 MR. HARRISON: Right.

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

4 (Simultaneous speaking)

5 MR. HARRISON: And can I get the
6 failures.

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

11 MR. HARRISON: Right.

12 CHAIRMAN STETKAR: Okay.

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

19 CHAIRMAN STETKAR: Yes.

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

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

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

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

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

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

20 MR. HARRISON: Right.

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

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

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

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

1 generic sense.

2 MR. HARRISON: Right.

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

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

14 (Simultaneous speaking)

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

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

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

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

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

10 (Simultaneous speaking)

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

13 MR. HARRISON: Yes --

14 (Simultaneous speaking)

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

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

24 (Simultaneous speaking)

25 MEMBER SCHULTZ: And in fact, you ought

1 to do it for sure.

2 MR. HARRISON: Yes.

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

5 MEMBER SCHULTZ: And have the
6 information to do so.

7 MR. HARRISON: Yes, the point is you
8 cannot meet the requirement as it's written because
9 you don't have that information. However, you
10 should go off and put something in your model that
11 --

12 (Simultaneous speaking)

13 CHAIRMAN STETKAR: I was going to say
14 you can't meet it in a precision sense, but you can
15 still make a reasonable assumption, a reasonable
16 estimate.

17 MR. HARRISON: And maybe when
18 we talk about what it means to "cannot meet," maybe
19 we can --

20 (Simultaneous speaking)

21 CHAIRMAN STETKAR: Yes, I mean, that's
22 --

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

1 want to do in those cases.

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

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

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

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

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

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

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

22 CHAIRMAN STETKAR: Yes.

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

25 CHAIRMAN STETKAR: But the point that I

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

5 MR. HARRISON: Right.

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

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

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

25 Again, partly why we said you could

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

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

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

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

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

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

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

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

25 Okay. The last topic was

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

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

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

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

3 (Simultaneous speaking)

4 MR. HARRISON: And this --

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

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

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

16 MR. HARRISON: Right.

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

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

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

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

9 MR. HARRISON: Yes, it's --

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

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

22 MEMBER SCHULTZ: That right.

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

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

6 MEMBER SCHULTZ: Yes.

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

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

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

25 MEMBER SCHULTZ: So when I saw it so

1 many times I thought the idea was to strengthen it.

2 MR. HARRISON: Yes.

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

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

11 (Simultaneous speaking)

12 MEMBER SCHULTZ: Right.

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

16 MEMBER SCHULTZ: Yes, I agree.

17 MR. HARRISON: Okay. We're at the
18 second-to-last slide. Do I have the right slides?
19 Oh, you want to go back?

20 CHAIRMAN STETKAR: No.

21 MR. HARRISON: Okay.

22 CHAIRMAN STETKAR: One more thing,
23 because I know you want to wrap up with the next
24 steps and the path forward. Through all of this I
25 found one place that I had a question, and it's on

1 Supporting Requirement SY, system; B, boy; 2, and
2 it relates to inter-system common-cause where in
3 the standard for Capability Category I and II. It
4 states, "No requirement to model inter-system
5 common-cause failures." For Capability Category
6 III it says, "Model inter-system common-cause
7 failures; i.e., across systems performing the same
8 function when supported by generic or plant-
9 specific data or show they do not impact the
10 results." The clarifications and comments on that
11 requirement state, "CC-I and CC-II contain no
12 requirement for modeling inter-system common-cause
13 failures. The staff expects the DC or COL
14 applicant to address (either model or show it has
15 no impact on the results) inter-system common-cause
16 failures if it is supported by generic data."

17 That seems to be staff guidance that
18 says you have to meet Capability Category III in
19 this particular area which is beyond the state of
20 practice. So why?

21 MR. HARRISON: Well, this is --

22 CHAIRMAN STETKAR: It's the only place
23 I found where you not only --

24 MR. HARRISON: There's two places where
25 I do this.

1 CHAIRMAN STETKAR: I missed the other
2 one.

3 MR. HARRISON: The other one is on the
4 trending analysis of the --

5 (Simultaneous speaking)

6 CHAIRMAN STETKAR: I missed the
7 trending analysis one.

8 MR. HARRISON: Yes, there's these two
9 places. And the reason why: if you think back to
10 current operating plants, the BWRs that have a HPSI
11 and a RCIC, they're considered separate systems,
12 but they model the common-cause failures often
13 times between either the pumps or the mechanism
14 there across system boundaries. Right?

15 CHAIRMAN STETKAR: Six hundred and
16 seventy-five motor-operated valves.

17 MR. HARRISON: We don't do that --

18 (Simultaneous speaking)

19 CHAIRMAN STETKAR: Why? This says you
20 ought to do it.

21 MR. HARRISON: Yes. And again, this --
22 well, yes. And again, the out that we put in is if
23 supported by generic -- we are invoking the
24 Capability Category III requirement here, but only
25 where you actually have data that says you need to.

1 Here it says support --

2 (Simultaneous speaking)

3 CHAIRMAN STETKAR: Well, we have beta
4 gamma delta factors, epsilon, probably not much
5 more than that, for motor-operated valves. They
6 don't say motor-operated valves within the high-
7 pressure injection system. They just say motor-
8 operated valves. So we have data.

9 MR. HARRISON: Yes, the intent here was
10 to make sure you didn't leave out things that are
11 traditionally --

12 (Simultaneous speaking)

13 CHAIRMAN STETKAR: Well, what's
14 traditionally? I now have a four-train plant.

15 MR. HARRISON: Right.

16 CHAIRMAN STETKAR: I have four trains
17 of high-pressure injection and low-pressure
18 injection and emergency feedwater, and lord knows
19 what else in an EPR and an APWR, my standard active
20 plant systems. I've got ancillary diesels. I've
21 got non-safety-related diesels. I've got a lot of
22 equipment in some of these plants. And this says
23 that now I need to look at common-cause failures
24 across those system boundaries.

25 MR. HARRISON: I need to be more

1 specific.

2 CHAIRMAN STETKAR: Well, or at least
3 careful here --

4 MR. HARRISON: Yes, I --

5 (Simultaneous speaking)

6 CHAIRMAN STETKAR: -- because this is a
7 place where to satisfy this again in just sort of a
8 pass/fail criterion or in the sense of a staff
9 reviewer that says, well, you haven't addressed
10 common-cause failure in motor-operated valves.
11 You've got four trains. Each train has two motor-
12 operated valves, four systems. I don't know. Do
13 the math. How many motor-operated valves. The
14 alphabet probably isn't big enough.

15 MR. HARRISON: Yes. No, and I've had
16 personal experience with this. I did slave relays
17 for our plant.

18 CHAIRMAN STETKAR: Yes, that's --

19 MR. HARRISON: So after you fail eight
20 slave relays, you know you got a bad batch and the
21 whole plant is going to melt. So, there's not a
22 whole lot of good insight there, but --

23 CHAIRMAN STETKAR: No, but that's the
24 only -- I didn't find the trending stuff.

25 MR. HARRISON: Yes, so that's a fair --

1 again, the intent was when I -- if you go back to
2 my early, early, early slide, I said any time there
3 was what I refer to as the do-nothing supporting
4 requirement, if there was a -- something that says
5 you meet a requirement by not doing anything. We
6 then looked at what the other requirement was in
7 that one to say should you do this other one
8 instead? Right?

9 CHAIRMAN STETKAR: Yes, but I mean this
10 is the one --

11 MR. HARRISON: This is one that --

12 (Simultaneous speaking)

13 CHAIRMAN STETKAR: -- this is one case
14 where it's pretty doggone explicit, at least the
15 way I read it. And if you use relay examples or
16 motor-operated valves, those types of things, I'm
17 not aware of anybody looking at that.

18 MR. HARRISON: Yes, and that wasn't the
19 intent of saying that. So we need to be careful on
20 that one of -- the real intent was to get where
21 someone's designated -- again, the same safety
22 function is being achieved by similar components,
23 but for whatever reason they've been designated to
24 be in different systems.

25 CHAIRMAN STETKAR: High-pressure, low-

1 pressure injection and emergency feedwater. The
2 same function if you consider feed-and-bleed
3 cooling or emergency blowdown to get low-pressure
4 injection for some sort of --

5 (Simultaneous speaking)

6 MR. HARRISON: And it's not -- yes.

7 CHAIRMAN STETKAR: -- its keep the cool
8 core function.

9 MR. HARRISON: Right. Yes, and the
10 intent is not to combine the emergency feedwater
11 with the high-pressure injection.

12 CHAIRMAN STETKAR: Yes, that's the
13 intent.

14 MR. HARRISON: Yes, we need to make it
15 clear. I hear you. We need to make that clear.
16 And again, it's such a nuance it may not even be
17 worth having in that sense. So, we can take that
18 back and think about it.

19 Okay. I think this is my last slide.

20 CHAIRMAN STETKAR: Yes.

21 MR. HARRISON: The next step is the
22 draft ISG should be going out for public comment
23 very, very, very, very soon. Very soon. We think
24 we're going to have it out for 45 days. And
25 parallel to this we're also engaging the Standards

1 Development organization on the working group level
2 on potential changes as a similar product as an
3 appendix.

4 Again, I just note here they may be
5 focused on Capability II as the state of practice
6 in essentially developing what they see as the
7 expected state of practice for the pre-operational
8 period. They also make take guidance all the way
9 up through fuel load or the early operational
10 period before you have actual data, operational
11 data. So we have slightly different boundary
12 conditions, but they may be going beyond where
13 we're at.

14 MEMBER SCHULTZ: But that makes sense
15 to do so.

16 MR. HARRISON: Yes.

17 MEMBER SCHULTZ: But in terms of the
18 first part, the potential for developing similar
19 product as an appendix, how close do you think you
20 are to achieving that?

21 MR. HARRISON: Let me see, a year ago I
22 would have said not.

23 MEMBER SCHULTZ: Right, I understand
24 that.

25 MR. HARRISON: Six months ago I would

1 have said not. Last week, yes, we might actually
2 get it done. So we've got some assignments we took
3 away from last week.

4 MEMBER SCHULTZ: That's right. Yes.

5 MR. HARRISON: There were some on
6 alignment that actually occurred last week at the
7 Standards meeting where for whatever reason people
8 understood our concerns and started agreeing with
9 us.

10 MEMBER SCHULTZ: What did you present
11 there? You didn't go into this level of detail, I
12 presume.

13 MR. HARRISON: No, back in September of
14 last year we presented at a high level our concerns
15 with the appendix at that time. In February we
16 went over like the initiating events as an example
17 of how we saw the world and then had some bar chart
18 that says here's how the rest of the internal
19 events piece looks. We hadn't done the external
20 hazards or anything at that point. Well, we had,
21 but they were rough draft at that point. So they
22 were seeing pieces.

23 CHAIRMAN STETKAR: Yes.

24 MR. HARRISON: And just to be frank,
25 there's an emotional piece. They had been working

1 on a standard --

2 CHAIRMAN STETKAR: Yes.

3 MR. HARRISON: -- appendix for a couple
4 of years. We walked in and said, no, don't do
5 this. Let us take a shot at it. Then we took six
6 months and came back and said here's what we think.
7 Then they're kind of like, well, how are you
8 different than us and why are you saying no when it
9 sounds like you're saying the same as what we were
10 trying to say? So there's some emotional
11 investment wrapped up in that.

12 The meeting we had last week, it
13 sounded like there's a path forward. I have a
14 homework assignment that Lynn gave me while I
15 wasn't in the room to go off and do some
16 comparisons of where we were proposing things and
17 what they were proposing and see if there's really
18 not that much different. I have to keep in my mind
19 they were looking at Capability Category II, so the
20 question you were asking right at the very start of
21 the meeting, I'm going to have to address that to
22 address that assignment.

23 CHAIRMAN STETKAR: Well, and a lot of
24 Capability Category II or separating DC from
25 everything after DC, regardless of where you want

1 to draw in operational time that line, is another -
2 -

3 MR. HARRISON: Well, and that was one
4 of the struggles we had with the original appendix
5 was it had no distinguishing -- and matter of fact
6 there's a sentence on one of the pages that talks
7 about the capability categories are flexible to the
8 stage. And so technically you could be Capability
9 Category at DC, but as soon as a COL came in with
10 an application, they wouldn't meet Capability
11 Category II anymore. And if you're making
12 applications at the same time using that
13 information, we just saw that as creating chaos.

14 MEMBER SCHULTZ: It's over-simplifying,
15 but it seems as if you could merge the two, what
16 they have been doing and what you've done, by
17 adding a couple of columns to what you've done.

18 MR. HARRISON: Yes, and some of it's --

19 (Simultaneous speaking)

20 MEMBER SCHULTZ: And incorporating what
21 they have done.

22 MR. HARRISON: Yes, they refer to
23 things as "alternative requirements." That sounds
24 like it's actually meeting the requirement by an
25 alternative means. That's not what they meant.

1 MEMBER SCHULTZ: Yes, I understand why
2 you wouldn't like that. Yes.

3 MR. HARRISON: Yes, so some of this is
4 terminology. The sensitivity to saying "cannot
5 meet," that came out of the meeting. They really
6 don't like being told they can't meet a
7 requirement.

8 MEMBER SCHULTZ: Yes.

9 MR. HARRISON: Even though it is a
10 supporting requirement within a standard.

11 MS. MROWCA: Yes, one of the other
12 issues that we had was it appeared that they were
13 developing this just like what you were alluding
14 to, having a separate appendix that took a plant
15 from application all the way through operation for
16 ALWRs. And that was not the concept that we had in
17 mind anyway from our lessons learned. And we just
18 learned last week they said, no, that's not what we
19 meant, even though it appeared the words on the
20 page --

21 MEMBER SCHULTZ: Sure looks like it,
22 doesn't it?

23 MR. HARRISON: And the conversations we
24 had in February were -- I want a transcriber next
25 time I go to a meeting, because I could have sworn

1 they said that.

2 MS. MROWCA: But they said, no, that's
3 not what we meant at all. It's like, well, I think
4 we can fix that with a few word changes then. So
5 that's what we started doing.

6 MEMBER SCHULTZ: Good.

7 CHAIRMAN STETKAR: Well, I mean, even
8 in today's discussion it's pretty evident that
9 different eyes reading the same words can have
10 different interpretations because you come at them
11 from a different experience base and slightly
12 different motivation in some cases. Well, and the
13 other part of it is, again, I read every single SR
14 at least twice, or five times. And I have in my
15 head what I know what the requirement is and what I
16 expect to be done. And so just a staff point you
17 made, I didn't even think to write down that --

18 CHAIRMAN STETKAR: Sure.

19 MR. HARRISON: -- don't go off and try
20 to make all the valves in the plant common-cause
21 failures. That wasn't what I was thinking in my
22 head. But I didn't write down --

23 CHAIRMAN STETKAR: Sure.

24 MR. HARRISON: -- that thought process.

25 MEMBER BLEY: That explains the high-

1 quality theoretical basis of our common-cause
2 modes.

3 CHAIRMAN STETKAR: There's some chance
4 that every single car in the parking lot down there
5 has four flat tires because one car had a flat tire
6 last week and another car had a flat tire
7 yesterday.

8 MEMBER REMPE: This seems to be a
9 private conversation.

10 (Laughter)

11 CHAIRMAN STETKAR: It's a long-standing
12 -- anyway, you folks have anything more?

13 MEMBER REMPE: Yes.

14 MEMBER SCHULTZ: Yes.

15 MEMBER REMPE: I have a question.

16 CHAIRMAN STETKAR: I said -- okay.

17 MEMBER REMPE: Isn't that you folks, or
18 am I --

19 (Simultaneous speaking)

20 CHAIRMAN STETKAR: No, the staff.

21 MEMBER REMPE: Oh, okay.

22 MR. HARRISON: You're us folks.

23 CHAIRMAN STETKAR: You're us folks.

24 MEMBER REMPE: Yes. Oh, so --

25 CHAIRMAN STETKAR: Unless there's --

1 (Simultaneous speaking)

2 MEMBER REMPE: I have a question about
3 his slide.

4 CHAIRMAN STETKAR: Oh, okay. Good.

5 MEMBER REMPE: And I started to do it
6 while you were talking about cars in the parking
7 lot because I thought it didn't pertain to us.

8 But anyhow, I don't see in here where
9 you'll be coming back to ACRS with what you're
10 going to be doing. What's your thoughts of where
11 you're going? I mean, it might have been nice if
12 we had seen this before it went out for public
13 comment, but perhaps that's not done very often.

14 CHAIRMAN STETKAR: We have.

15 MEMBER REMPE: Yes.

16 MS. MROWCA: It's not out yet.

17 CHAIRMAN STETKAR: It's not out yet.

18 MEMBER REMPE: Well, it sounds like if
19 you're going to do this -- are you going to revise
20 this based upon the comments today before you -- I
21 mean, I thought you said you were about to put it
22 out the door.

23 CHAIRMAN STETKAR: Joy, this is a
24 Subcommittee briefing. This has no --

25 MEMBER REMPE: Right, so it's not

1 official. I understand.

2 CHAIRMAN STETKAR: -- bearing on
3 anything.

4 MEMBER REMPE: But there are some
5 things that are just typos.

6 CHAIRMAN STETKAR: I'm going to go
7 around the table later and ask whether or not we
8 should bring this to the Full Committee, but --

9 MEMBER REMPE: Okay.

10 CHAIRMAN STETKAR: -- that's a
11 different issue.

12 MEMBER REMPE: But what I'm just asking
13 him in his mind -- what is your thought of when
14 this would come back to ACRS?

15 MR. HARRISON: My mind is that we're
16 going to go out for a 45-day public comment period.
17 We're going to get comments on some of these items,
18 I know. Some of the stuff I've heard today, I plan
19 to reflect on that. And while I'm updating for the
20 public comment period, I'm going to try to address
21 those as well.

22 So I would foresee some of these like
23 that last one of going back and talking with Lynn
24 and her staff about how critical really is it that
25 to say think about inter-system common-cause

1 failures? Is it really that significant given
2 these designs? Do you want to just accept and say,
3 no, for Capability I, II you don't have to do this?
4 And then keep an eye, maybe write a note that says
5 if you really see this, we should maybe have the
6 staff ask a question as opposed to being an
7 expectation.

8 So I plan on kind of taking the
9 conversation here and tweaking --

10 MEMBER REMPE: Before it goes out for
11 public comment, or after?

12 MR. HARRISON: No, after.

13 MEMBER REMPE: Okay.

14 MR. HARRISON: Because it's already
15 kind of heading out the door.

16 MEMBER REMPE: That's what it sounded
17 like, yes.

18 MS. MROWCA: And again, thank you for
19 your thoughtful questions and comments, because
20 those kind of things can be brought up in the
21 public venue whenever we have our meeting as here's
22 some additional suggestions that we might have to
23 change what's here. What do you think?

24 MR. HARRISON: This is closed because
25 we didn't get out the FRN to make it public, to

1 make an open meeting. Right. So we've been
2 pushing --

3 (Simultaneous speaking)

4 CHAIRMAN STETKAR: Well, and also the
5 documents that we got were stamped "official use
6 only, pre-decisional."

7 MR. HARRISON: Yes.

8 CHAIRMAN STETKAR: So therefore, in
9 principle if anything had changed from those
10 documents to today, that's all we had available.
11 So any comments that we would have made --

12 MR. HARRISON: And the only comment
13 was; and you quoted it, is there's 86 times I use a
14 phrase related to the word "expect." Sixty-some of
15 those got changed.

16 CHAIRMAN STETKAR: Okay.

17 MR. HARRISON: Where we deleted the
18 word "expect." And if it said the staff expects
19 you to do X, we just said you should do X.

20 CHAIRMAN STETKAR: Oh, okay.

21 MEMBER BALLINGER: So you're saying
22 that -- are you or are you not going to reflect on
23 what's happened today and have that reflected in
24 the document that goes out for public comment or
25 not?

1 MR. HARRISON: No.

2 CHAIRMAN STETKAR: Essentially I think
3 what Donnie is saying is this exchange here among
4 one, two, three, four, five individuals; not the
5 ACRS, is effectively part of the public comments.

6 MR. HARRISON: That's how we're going
7 to treat it, yes.

8 MEMBER BALLINGER: Oh, okay.

9 MR. HARRISON: Yes.

10 MEMBER BALLINGER: Okay.

11 CHAIRMAN STETKAR: We are in this forum
12 individuals who are members of the public and not
13 the ACRS.

14 MR. HARRISON: And I'm not going to
15 make you actually write down comments. Again, we
16 heard the conversation --

17 CHAIRMAN STETKAR: Well, you're on a
18 transcript, so you --

19 MR. HARRISON: Yes. But the intent is
20 to do that, is to go back, take what we've heard,
21 fix those things, reflect on them in the context of
22 the other 45-day public comment period. Because
23 like I said, the 10 to the minus 5 number, I've
24 already been told informally people don't like that
25 the screening criteria. So we're going to get

1 comment on it. This will go in with that pile.

2 CHAIRMAN STETKAR: This, by the way,
3 isn't particularly unusual. I mean, we've done
4 this before with Reg Guides and things like that
5 where we've had a Subcommittee meeting to give the
6 staff feedback on a draft Reg Guide that was on its
7 way out for public comments. But because of the
8 schedule -- it was the time. Our schedule, their
9 schedule. It was inability at the Subcommittee
10 level, at least, to get feedback. And
11 then typically what we've done with Reg Guides is
12 wait until they come back from public comments, see
13 how the staff addresses the public comments, see
14 how the staff has addressed Subcommittee members'
15 comments and then make a determination of whether
16 we want to have another Subcommittee meeting for
17 the final draft of the Reg Guide or take it to the
18 Full Committee maybe in that sense. And this is
19 somewhat similar to that process.

20 MS. MROWCA: And there will be more
21 chances for interaction, because once this gets
22 published, then eventually it's going to be
23 incorporated into Reg Guide 1.200, Rev 3. And the
24 standard, if it goes out, it's going to be for
25 trial use for probably three years. So this ISG is

1 probably going to stand for at least three years
2 before --

3 (Simultaneous speaking)

4 CHAIRMAN STETKAR: Yes. Well, but see,
5 that's the concern, is that if the ACRS next sees
6 it at the Reg Guide or SRP or standard -- we don't
7 see standards, but either the Reg Guide or the SRP,
8 the ISG by that time has developed a very, very
9 robust life of its own. At that point it's very,
10 very difficult to head things down a different
11 track, which is the problem we've had with a lot of
12 the ISGs, quite frankly. So, yes, we would have
13 another opportunity, but it isn't the same type of
14 dynamic interaction.

15 MS. MROWCA: Yes, it's pretty rare to
16 revise ISGs, even though it has been done --

17 CHAIRMAN STETKAR: No, it has been
18 done.

19 MS. MROWCA: -- but not too often.

20 CHAIRMAN STETKAR: Not too often, but -
21 - okay.

22 MS. DRUID: Right, but the intent, when
23 Lynn says it's going to be incorporated into the
24 Reg Guide 1.200, we've made it very clear to the
25 public that this ISG will ultimately be withdrawn

1 or sunset
2 -- I don't know what is the right word -- withdrawn
3 because once we issue Reg Guide 1.200, this goes
4 away. Now there will be opportunity at that point
5 because we will be taking lessons learned from the
6 ISG. The standard will be out for trial use. So
7 there will be I would say at least two, maybe three
8 opportunities to further refine our position on all
9 of these requirements.

10 CHAIRMAN STETKAR: Anything else from
11 the staff?

12 MR. HARRISON: I'm packing up.

13 CHAIRMAN STETKAR: I see you doing
14 that.

15 (Laughter)

16 CHAIRMAN STETKAR: What I'd like to do
17 is, as we always do in the Subcommittee meeting, is
18 go around the table and see if any of the members
19 have any final comments or questions. And in
20 addition to that, ask you whether you think there's
21 any motivation to bring the ISG at the current time
22 to the Full Committee. Joy?

23 MEMBER REMPE: Okay. Well, I came here
24 to learn and I think I met my objective, not only
25 from the presentation, but the discussion and items

1 brought up from my colleagues and ACRS and your
2 responses back to them. And so I appreciated that
3 exchange.

4 With respect to your question, again,
5 even though I've been on ACRS and starting on my
6 second term in October, I think from what I know
7 it's better to wait until it comes back from public
8 comment and see how you've updated it before it
9 would come to ACRS.

10 CHAIRMAN STETKAR: Ron?

11 MEMBER BALLINGER: I'm still learning,
12 and I'm learning a lot. If it was brought to the
13 Full Committee, the Full Committee's comments would
14 then be considered public comments, is that
15 correct??

16 CHAIRMAN STETKAR: The ACRS is the
17 ACRS, so if we bring it to the Full Committee for a
18 briefing of the ACRS, that's a briefing of the
19 ACRS. The Committee then can decide whether or not
20 there's anything that's important enough for the
21 Committee to write a letter, at which point it
22 becomes an ACRS position.

23 MEMBER BALLINGER: Right, but the
24 Committee would then not supply any additional
25 feedback? That would be considered public comments

1 like this --

2 (Simultaneous speaking)

3 CHAIRMAN STETKAR: The ACRS meeting
4 would be public, because that's what we do.

5 MEMBER BALLINGER: Okay.

6 CHAIRMAN STETKAR: So anything that is
7 mentioned at that meeting would be on the public
8 record, but it is not an ACRS position.

9 MEMBER BALLINGER: Right. Right.

10 CHAIRMAN STETKAR: It's simply 14 of us
11 rather than 5 of us sitting in a room asking
12 perhaps repetitiously some of the same questions or
13 additional questions.

14 MEMBER BLEY: And the public comment
15 period would have been closed at that point.

16 MEMBER BALLINGER: Oh, it would have
17 been closed?

18 MEMBER BLEY: Yes, because they will
19 have looked at the public comment.

20 MEMBER BALLINGER: Okay. That was my
21 next question. Okay.

22 CHAIRMAN STETKAR: Well, if it goes --

23 (Simultaneous speaking)

24 MEMBER BLEY: Well, but if we go like
25 tomorrow --

1 CHAIRMAN STETKAR: Yes, I mean, if we
2 brought it to the Full Committee in November, for
3 example. In that context it's as I described. It
4 would be either out for public comments or, in its
5 current form, draft ISG.

6 MEMBER BALLINGER: So it wouldn't do us
7 any good --

8 MEMBER SCHULTZ: In its current form.

9 MEMBER BALLINGER: -- because no
10 additional feedback would be provided they could
11 use?

12 MEMBER SCHULTZ: It depends what the
13 Full Committee would say.

14 CHAIRMAN STETKAR: It depends on what
15 the Full Committee decides to say. If the Full
16 Committee decided there were one or more issues
17 that merited the Committee's feedback to the EDO in
18 a formal letter form, then that would happen and
19 that would be --

20 (Simultaneous speaking)

21 CHAIRMAN STETKAR: -- responses to
22 those letters.

23 MEMBER BALLINGER: In that case I'd
24 defer to you guys, because you're the experts.

25 CHAIRMAN STETKAR: Okay. Anything

1 else? Steve?

2 MEMBER SCHULTZ: Let me address the
3 second part first: I think the best timing would
4 be after the public comment period and after the
5 staff has determined how they're going to respond
6 to public comments, that we have another
7 Subcommittee and follow that with a Full Committee
8 meeting. Because I think that's the time that the
9 Full Committee comment would carry weight at the
10 right time to help the staff move this forward, not
11 only internally, but externally.

12 And the second part is thank you so
13 much for the presentation. I think this certainly
14 represents good work by the staff to pull something
15 together that based on our experience, my
16 experience of how we want to place it is really
17 needed to help provide guidance both the staff and
18 to the applicants to reset, if you will, what is
19 expected with regard to the performance PRAs at
20 these various stages. So I think it's a good piece
21 of work. And some tweaks are needed.

22 But I'm also very interested to get --
23 the reason I stated the sequence the way I did is
24 I'm very interested to see what the public comments
25 will be in certain particular areas and I'm not

1 sure that the Full Committee could -- I'm sure they
2 would have comments certainly, but I think again
3 hearing the public comments and seeing how the
4 staff is intending to resolve them, that would be
5 the right timing for us to weigh in as the Full
6 Committee.

7 CHAIRMAN STETKAR: Thanks. Dennis?

8 MEMBER BLEY: I agree with Steve and
9 Joy on the timing and that it's probably a good
10 idea for us to take a look. I'd like to thank the
11 staff for bringing this to us at this time. And
12 I'd echo Steve in that given some of the things we
13 saw in looking at design cert PRAs and associated
14 Chapter 19s, we probably need this.

15 CHAIRMAN STETKAR: Thanks. And I'll
16 weigh into that. I don't think that there is a
17 need to bring it to the Full Committee, especially
18 before public comments. I do think that despite
19 the fact that it's Interim Staff Guidance that it
20 does have -- we can't anticipate the number of
21 design certifications that may be coming in in the
22 next X number of years, where X is greater than 1
23 and less than n, whatever the Reg Guide and the --
24 will be updated. And that's not our -- we don't
25 try to foresee that.

1 So I think that this Interim Staff
2 Guidance is pretty important in terms of how
3 potential applicants, either SMRs or other large
4 plants, will organize the risk assessment part of
5 the application. So in that sense, depending on
6 what happens after the public comments, the Full
7 Committee may or may not -- but I agree, I think we
8 should have another Subcommittee meeting after
9 public comments and you've had a chance to address
10 them, and then take it from there as far as where
11 we go with it.

12 Regarding an overall -- despite my
13 whining and stuff, I think that you did a lot of
14 really good work with this to clarify things, to
15 address, as Dennis said, areas that we've seen not
16 only deficiencies, but extreme variability in the
17 applications. This --

18 (Simultaneous speaking)

19 MEMBER BLEY: -- confusion, yes.

20 CHAIRMAN STETKAR: Yes. Well, my
21 interpretation versus your interpretation and
22 neither of them necessarily being what the staff
23 originally expected. So I think it's going to help
24 an awful lot there. And I really do appreciate the
25 amount of time and effort you put into pull all of

1 this stuff together for a four-hour presentation
2 this afternoon, because there's a ton of stuff
3 there.

4 And, Donnie, if you have every one of
5 those supporting requirements memorized, you're a
6 sick puppy.

7 (Laughter)

8 CHAIRMAN STETKAR: And with that, if
9 there are no other comments, the meeting is
10 adjourned.

11 (Whereupon, the above-entitled matter
12 went off the record at 5:16 p.m.)

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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 $< 10^{-5}/\text{yr}$, 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 $< 10^{-6}/\text{yr}$.

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 informationOR
 - 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