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

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 (ACRS)

6 + + + + +

7 SUBCOMMITTEE ON THE WESTINGHOUSE AP1000 DESIGN

8 CONTROL DOCUMENT AMENDMENTS AND NRC DRAFT

9 SAFETY EVALUATION REPORT WITH OPEN ITEMS

10 + + + + +

11 TUESDAY, OCTOBER 6, 2009

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13 ROCKVILLE, MARYLAND

14 + + + + +

15 The Subcommittee convened at the Nuclear
16 Regulatory Commission, Two White Flint North, Room
17 T2B3, 11545 Rockville Pike, at 8:30 a.m., Mr. Harold
18 Ray, Chairman, presiding.

19 SUBCOMMITTEE MEMBERS:

20 HAROLD RAY, Chairman

21 SANJOY BANERJEE, Member

22 DENNIS C. BLEY, Member

23 MARIO V. BONACA, Member

24 MICHAEL T. RYAN, Member

25 WILLIAM J. SHACK, Member

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CONSULTANT TO THE SUBCOMMITTEE:

THOMAS S. KRESS

NRC STAFF PRESENT:

MICHAEL LEE, Designated Federal Official

WEIDONG WANG

EILEEN MCKENNA

DAVID JAFFEE

OM CHOPRA

PATRICK DONNELLY

PAUL PIERINGER

JOHN HONCHARIK

PHYLLIS CLARK

KENNETH SEE

CHANG-YANG LI

JERRY CHUANG

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ALSO PRESENT:

MARK DEMAGLIO

ROBERT SEELMAN

ROB SISK

ED CUMMINS

PAUL J. HUNTON

JULIE REED

DALE WISEMAN

GREG MEYER

DONALD LINDGREN

AMY MONROE

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P R O C E E D I N G S

(8:57:42 a.m.)

CHAIR RAY: The meeting will now come to order. This is the first day of the meeting of the AP1000 Reactor Subcommittee, the first day of this two-day series. We are a standing Subcommittee of the Advisory Committee on Reactor Safeguards, or ACRS. I'm Harold Ray, Chairman of this Subcommittee.

Other ACRS members in attendance today are Sanjoy Banerjee, who will join us shortly, Dennis Bley, Mario Bonaca, Bill Shack, and Mike Ryan. I don't think I've overlooked anyone. Tom Kress, an emeritus of the ACRS and former Committee Chairman is also seated here at the table with us today, and he is invited consultant to the Subcommittee for this work.

Mike Lee of the ACRS Staff is a Designated Federal Official for this meeting, and he's also joined by Weidong Wang, also of the ACRS Staff. Sorry for the German pronunciation.

The purpose of this Subcommittee meeting over the next few days will be continue with a review, and discussions concerning Revision 17 of the Design Control Document, describing a standard plant design for the AP1000 pressurized water reactor. The most recent Subcommittee meetings on this subject were held

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1 this past July.

2 By way of background, we're reminded that
3 the Westinghouse Electric Company submitted Revision
4 17 of the DCD to the U.S. Nuclear Regulatory
5 Commission, and that since its submittal, the NRC
6 Staff in the Office of New Reactor Licensing have been
7 engaged in review of those revisions, and have
8 complemented this review with meetings with
9 Westinghouse representatives, and members of the
10 AP1000 Design Center group.

11 Upon completion of this review, the Staff
12 will issue a Final Safety Evaluation Report related to
13 the certification of the revised standard design. As
14 part of the design certification process, the NRC
15 Staff are required to obtain the views of the ACRS.
16 Today, and in subsequent meetings, this Subcommittee
17 will hear from the Staff on the results of their
18 review of the DCD Amendments. And we will hear, also,
19 from the Applicant.

20 I understand that copies of the detailed
21 meeting agenda have been made available. When looking
22 at the agenda, you will see that each chapter, a
23 standard briefing template will be followed that
24 consists, essentially, of three elements, a discussion
25 of the Revision 17 changes to the DCD by

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1 representatives of Westinghouse, and the significance
2 of those changes over the NRC certified Revision 15.

3 A discussion of the Draft SER prepared by the NRC
4 Staff corresponding to the DCD Chapter that has just
5 been described by the Applicant, and a discussion of
6 any applicable open items by the Staff.

7 In summary, this Subcommittee intends to
8 gather information, analyze relevant issues and facts,
9 and formulate proposed positions, and actions, as
10 appropriate from this meeting for deliberation by the
11 Full Committee of the ACRS at a later date. We may
12 also determine additional meetings on one or more of
13 the items discussed over the next two days merits
14 further discussion, and study by the Subcommittee.

15 The rules for participation in today's
16 meeting have been announced as part of the notice of
17 this meeting previously published in the Federal
18 Register. And I'll note that that notice also
19 indicated we would begin at 8:30. We've had a number
20 of changes, including the room location. We're
21 starting at 9:00 today. And, I guess, tomorrow that
22 will be the same. Is that right?

23 MR. LEE: 8:30.

24 CHAIR RAY: 8:30 tomorrow. Okay. So,
25 we'll all be on time at 8:30, as we were this morning.

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1 I believe we received no written comments,
2 or requests for time to make oral statements from
3 interested members of the public regarding the subject
4 of today's meeting. I understand that we have a
5 speaker phone in operation today, and we'll ask that
6 those individuals participating in this Subcommittee
7 over the telephone bridge lines place their speaker
8 phones on mute.

9 As stated earlier in the Federal Register
10 Notice, a transcript of this meeting is being
11 prepared, and will be made publicly available in the
12 near future on the ACRS website; therefore, we request
13 that anyone wishing to address the Subcommittee on the
14 record use one of the microphones located throughout
15 the meeting room. We request that you first identify
16 yourself, and your affiliation, and speak with
17 sufficient clarity and volume so that your comments
18 may be readily heard, and recorded.

19 We also request that if you're in
20 possession of cell phones, or some other type of
21 electronic paging device, you adjust it to the silent
22 mode, or, alternatively, turn it off so as not to
23 interrupt the conduct of the meeting.

24 Now, with those introductory remarks,
25 we'll turn to Eileen McKenna to introduce the Staff,

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1 and any comments that she wishes to make before the
2 presentation by the Applicant. Eileen.

3 MS. McKENNA: As he said, my name is
4 Eileen McKenna. I'm a Branch Chief in the Office of
5 New Reactors, responsible for AP1000 projects, in
6 particular, the review of the Design Certification
7 Amendment for AP1000 design.

8 As you indicated, in July we met with the
9 Committee on a number of chapters of our SER with open
10 items for the amendment. And, today and tomorrow, we
11 will be meeting on three chapters, Chapter 8 on
12 Electrical Power Systems; Chapter 18 on Human Factors
13 Engineering, and a significant portion of Chapter 3 on
14 the design of Structures, Systems, and Components.
15 There is another portion of that chapter that will be
16 covered at a later meeting, which covers the seismic
17 analysis, of structures, in particular.

18 As you indicated, the focus of the Staff's
19 review is on the changes that have been presented in
20 the application since Revision 15, so the Staff
21 focuses on the changes, and any potential impacts of
22 those changes on the rest of the design. This is not
23 a complete review of new design certification.

24 Also, note that we did issue to the
25 Committee two other chapters of the SER with open

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1 items, these are Chapter 2 on Site Characteristics,
2 and Chapter 13 on Conduct of Operations. We don't
3 plan a formal presentation on those topics, because we
4 don't think that there is any significant technical
5 issues that the Committee would not get into on other
6 occasions. For example, there is some geotech
7 information that is closely coupled to seismic
8 analysis, so you would hear about that at a later
9 time. If you have questions on those chapters, of
10 course, we'd be happy to answer them, but we don't
11 plan formal presentations with the Committee on the
12 SER with open items.

13 We also have on the agenda today a session
14 to follow-up on some of the questions that came up in
15 the July meeting. There were a number of topics for
16 which the Subcommittee requested further information,
17 and Westinghouse will be responding to a number of
18 those questions later today. I will just note, also,
19 that in terms of our slide presentation, the Staff's
20 slides are all in one package in the order in which
21 they will be presented.

22 At this point, I will turn to -

23 MEMBER BLEY: May I?

24 MS. McKENNA: I'm sorry. Yes, sir?

25 MEMBER BLEY: May I slip in a question.

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1 MS. McKENNA: Of course.

2 MEMBER BLEY: You probably don't expect
3 them in the beginning.

4 MS. McKENNA: Any time.

5 MEMBER BLEY: Can you briefly describe to
6 me how -- as you review something that's changed, how
7 you remember other places in the old DCD that might be
8 affected by the thing that just changed?

9 MS. McKENNA: I think it's a matter of the
10 understanding of what is the feature, the aspect of
11 the design that's being changed in a particular area,
12 and the technical reviewer being cognizant of that.
13 And I'll also say the first premise, the Applicant's
14 responsible to identify, if because they're changing
15 something in Chapter 4, they need to change something
16 in Chapter 15. That should be included in their
17 application, so that's kind of the first level of
18 confirmation. The second level is the Staff being
19 aware of well, if I'm changing something on this
20 valve, then, maybe, I need to check whether the tech
21 specs need to have a change, or whether some ITAAC
22 need to be adjusted based on what that particular
23 change is all about, or the safety analysis may need
24 to be looked at to see whether, as a result of that
25 change, the safety analyses might need to be

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1 revisited. So, I think that's the process of the
2 Applicant doing their job, and the Staff doing its
3 job, being familiar with what the -- how an FSAR, if
4 you will -

5 MEMBER BLEY: I guess what I was trying to
6 get at is, these reviews, I'm sure, are partitioned
7 out, and it might be a new person who isn't familiar
8 with the whole design. And I was really hoping there
9 would be some -- either some tracking process from the
10 earlier review, or someone who is the grant integrator
11 on your side who really is familiar with the whole
12 design, and could double check the things people are
13 doing.

14 MS. MCKENNA: I think there are tracking
15 mechanisms. There are change bars, for example, and
16 things like that, and lists of what has changed from
17 15 to 17, so I think that level of information is
18 available. And then, as I say, you're right. We do
19 reviews by technical discipline, and by standard
20 review plan section, and then we bring them together
21 into the chapters, which is how the design control
22 document is structured, and how our earlier SER was
23 structured along chapters. And sometimes that does
24 bring together input from a number of branches to
25 cover a particular topic area. And we are, certainly,

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1 cognizant of looking for those kinds of impacts, and
2 awareness to make sure that we don't, inadvertently,
3 approve something as a change, and it's inconsistent
4 with something else in the document.

5 MEMBER BLEY: Thank you.

6 CHAIR RAY: We're going to stick with you
7 for a minute or two here, Eileen, because I know Dr.
8 Ryan may want to pursue a point here in a moment, but
9 I'd like to follow-up on what Member Bley just asked
10 you about.

11 There is a change matrix. You and I were
12 just looking at it a minute ago. The version I have is
13 from October 2008. Is it kept up-to-date?

14 MS. MCKENNA: I think I would ask
15 Westinghouse to discuss that in their remarks. I
16 mean, this was a document they provided to us, as a
17 tool to assist us.

18 CHAIR RAY: You're not aware of it being
19 kept up-to-date then. Is that correct?

20 MS. MCKENNA: I haven't seen an updated
21 version.

22 CHAIR RAY: Okay. We'll get to
23 Westinghouse in a -

24 MS. MCKENNA: What we get, typically, is
25 when there is a response to an RAI, for example, a

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1 question that we -- yes, there would be a markup of
2 the Design Control Document, as a result of that RAI,
3 with particular information that's proposed to be
4 changed in the DCD, with redline and strikeouts so we
5 can see what kinds of changes are being proposed. And
6 that we then anticipate getting a complete new
7 revision at some future date, with appropriate
8 markings of changes, so that we can see the -- how all
9 those changes are fit together.

10 CHAIR RAY: The inference, I think, of
11 what you're saying is that all of us, Staff and ACRS,
12 perceive changes by changes in a rather large body of
13 text. Is that correct? That's what you just
14 described to me. That's my understanding of it.

15 MS. McKENNA: Yes, I think that -

16 CHAIR RAY: In other words, you perceive
17 that a change is of this size, and shape, and nature,
18 by what effect it has on the text in various places.

19 MS. McKENNA: Well, I think that's part of
20 it, but I think part of it is, sometimes just a simple
21 change in the text could be a very significant change
22 in the review. And I think we might have an example
23 in our first topic, where we changed one number, but
24 it did trigger some significant review. So, I don't
25 know directly how many words change to the

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1 significance of the change.

2 CHAIR RAY: I think we're all trying to --
3 or some of us, anyway - speak for all of us, some of
4 us are trying to understand how a change gets
5 described. And beginning with the change matrix,
6 which is a quite substantial 93-page document, that's
7 one way. You could say well, here's a change, and it
8 affects all these places. Here's another change that
9 affects all these places. That's one way to do it.
10 But if you don't keep it up-to-date, then its
11 usefulness becomes questionable after a while.

12 MS. McKENNA: I think another thing is
13 that depending on the topic area, and how many changes
14 are going on, on occasion, you may recall in previous
15 discussions we talked about technical reports. And,
16 in some cases, where there might be a lot of changes
17 in play, there would be an update of the technical
18 report. I'll give you an example that will be coming
19 in a future meeting, it has to do with GSI-191, where
20 there were a lot of changes and things going on in the
21 Design Control Document about how the sump screens,
22 and the post LOCA recirculation would work. And
23 there's actually a separate document to put all of
24 those changes together, so that we can see the full
25 picture. So, I think we use things -- mechanisms like

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1 that, where it may be more involved than just changing
2 a couple of words to deal with a very narrow change,
3 to make sure we are seeing the broader picture.

4 CHAIR RAY: Well, does the Staff
5 appreciate how difficult it is for the ACRS to
6 recognize a change, and define the change?

7 MS. McKENNA: I think we do, because we've
8 -- it's not always been easy for us, because of how
9 things evolve from Rev 15 into Rev 17, and even
10 earlier Revs of this thing. It is sometimes a
11 challenge to understand how everything fits together,
12 so we just have to work extra hard. And, I'm sorry,
13 the Committee may have to, also.

14 CHAIR RAY: Well, I understand, and we're
15 trying to learn from this process.

16 MS. McKENNA: Yes.

17 CHAIR RAY: But that's the nature of the
18 question, is to ask you, if this change matrix define
19 the changes and are either kept up-to-date, or there
20 were no more changes, neither of which appears to be
21 true, then we could, in theory, track changes by this
22 change matrix, because it tells you what's changed,
23 although very succinctly, and what all was affected by
24 it. But if you don't keep it up-to-date as more
25 changes take place, then that becomes problematic.

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1 And, also, then, of course, one has to question
2 whether this is an adequate road map to recognize what
3 changes have occurred. Well, enough on that for now.

4 I think you raised an issue of seismic,
5 and that we would discern what things affected Chapter
6 2 in the seismic area later, but Dr. Ryan would like
7 to pursue that, I think, a little further.

8 MEMBER RYAN: Just a question, and it's
9 probably not a big issue. It's something
10 straightforward. I guess, a little short briefing, or
11 some more information to help us agree with you, or
12 disagree with you would be great.

13 MS. McKENNA: I think there we have -- in
14 the Design Control Document in Chapter 2, you're
15 looking at parameters that kind of form an envelope,
16 if you will, for the analysis. And there were some
17 changes there on some of the soil information to allow
18 different sites to, potentially, reference the design.

19 But the real fruit of the analysis, if you will, is
20 in Chapter 3, where you do the seismic analysis with
21 that information to see whether your Structures,
22 Systems, and Components meet the acceptance criteria.

23 So, that's kind of what I meant by kind of get it
24 through that process.

25 MEMBER RYAN: Maybe somewhere in a future

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1 meeting, a little bit more detail on that would be
2 helpful.

3 MS. McKENNA: Certainly. Of course.

4 MEMBER RYAN: Thank you.

5 MS. McKENNA: Okay.

6 CHAIR RAY: All right. Anything more at
7 this time, Eileen?

8 MS. McKENNA: No. I was going to turn it
9 over to Westinghouse, to see if they had any opening
10 remarks before we start the first Staff Panel.

11 MR. SISK: Good morning, Chairman, Members
12 of the ACRS. Once again, we do thank you for the
13 opportunity to come and continue the review, and
14 discussion around the changes to the DCD. We'll have
15 several members coming through as we go through the
16 discussions today. I won't take the time now to
17 introduce everyone. I would like to introduce, once
18 again, our VP of Regulatory Affairs and
19 Standardization, Ed Cummins. And, Ed, I don't know if
20 you want to say hello.

21 MR. CUMMINS: Hello. My name is Ed
22 Cummins.

23 MR. SISK: But we'll have others coming
24 through, as we go forward.

25 Today, I think, as Eileen indicated, we're

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1 going to continue the review of the amended designs
2 and the changes that were presented through Rev 17.
3 We're going to be talking about Chapter 8, the
4 Electrical section, 18, the Human Factors, and
5 portions of Chapter 3. I really wasn't going to
6 belabor any further comments, and just go straight
7 into it, unless there is any other comments, or any
8 questions from the Committee.

9 CHAIR RAY: Well, you've heard the
10 dialogue we've had with the Staff. I won't ask you to
11 comment on it, specifically. We've had a half-hour
12 here of time. I think your presentation probably will
13 highlight changes, as such, as opposed to the labor
14 that we've been going through of trying to discern
15 what the changes are from hundreds and thousands of
16 textual modifications. And it's that sort of thing
17 that we're grappling with here. I think you're
18 probably going to address it in a way that will help
19 us figure out what is changing.

20 MR. SISK: We hope to. I would make one
21 comment to the discussion. The road map that Eileen
22 was referring to, really is the road map through 17.
23 And we provide a road map to help understand what the
24 changes were through 17. It is recognized that
25 through the RAI process, through the open item process

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1 with the SERs that additional changes are anticipated,
2 and, obviously, expected to resolve Staff issues and
3 concerns. And there will be additional changes in the
4 conforming DCD to reconcile comments that come out of
5 these discussions.

6 CHAIR RAY: Yes. Well, we do realize
7 that. The road map, at least at the moment that it
8 was created, was helpful. We're trying to figure out
9 how to take the road map and adjust it for all these
10 other things. And, basically, keep it real simple,
11 it's hard to look at the many, many changes to the
12 text, and figure out what has happened. And we're
13 struggling with how to better identify these changes
14 so we can think about them the way we're supposed to
15 do, as opposed to just many, many changes to text, and
16 figures, and tables, and so on, and so forth. And
17 that's an ongoing process, as you say. The technical
18 reports that Eileen referred to may be the only way,
19 and the reviewing RAIs, or the SER, itself, which we
20 get in dribs and drabs, so we're struggling. I want
21 you to understand that our effort is to try and move
22 this along in an efficient way. And, like I say, we
23 look forward to your presentation.

24 MR. SISK: Anything we can do as we go
25 through questions, clarity to help in that process, we

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1 certainly want to maintain that -

2 MEMBER SHACK: Just a quicky.

3 MR. SISK: Yes, sir?

4 MEMBER SHACK: What's the difference
5 between a blue change, and a green change?

6 MR. SISK: What we were doing was color
7 coding the changes based on what the Staff had seen,
8 and not seen previously.

9 MEMBER SHACK: Oh.

10 MR. SISK: Black dots were basically the
11 certified text. The blue text and the green text
12 depended, there was a technical report that was
13 issued, 134, which covered changes that the Staff had
14 reviewed and looked at, so we were trying to say these
15 are changes that you've seen, but they weren't in the
16 DCD.

17 MEMBER SHACK: Here's the green dot.

18 MR. SISK: That's the green. That's
19 correct.

20 MEMBER SHACK: Okay.

21 CHAIR RAY: There's a key at the top of my
22 version, Bill. I don't know if it shows up on your's,
23 because I've got a hard copy, and you're looking at
24 something different. But, anyway, that tracks these
25 against the various, Revision 5, TR134 is the green

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1 text, according to this legend.

2 Okay. Well, enough about that for now.
3 We'll doubtless have reason to come back and ask
4 questions further. Perhaps, if we plunge into Chapter
5 8.

6 MS. MCKENNA: Okay. Before we start, I
7 might suggest the Staff members to join Westinghouse
8 at the front, and say that's -- we kind of had done
9 this, I think, at the last meeting, where we had the
10 Staff and Westinghouse at the front table, and
11 Westinghouse will present first, and then the Staff
12 will present the results of its evaluation and
13 conclusions.

14 CHAIR RAY: As you wish.

15 MR. SISK: We'll focus on you guys for
16 now.

17 CHAIR RAY: Go ahead.

18 MR. SISK: Okay. With that being said,
19 the first chapter is Chapter 8. I'd like to introduce
20 Bob Seelman, our Licensing -

21 MEMBER BONACA: Could I ask just a
22 question? As we go through, I've been asking myself
23 what's driving all these changes? And, so, I'm trying
24 to learn about it, irrespective of AP1000 alone.
25 Okay? Clearly, we have different motivation for the

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1 changes, but still I'm left with a question in my mind
2 of when we reviewed the DCD, originally there was a
3 presumption on our part, a naive presumption that that
4 was it. Well, now I was looking at this over the
5 weekend, and that's a lot of changes. And I
6 understand there will be different sources, but could
7 you give me a sense of what's driving the most of
8 these changes?

9 MR. SISK: Part of the -- I think what
10 drives the changes is partly continuing through the
11 design process, itself, doing the refinements of the
12 design and moving towards constructability. I think
13 that might be a key area. Obviously, as we go through
14 those design refinements, we have COL holder items
15 that we're looking to close out, we have three DACs
16 that we're going to be talking about over time that
17 need to be closed out. And as we go through the
18 holder items, the DAC, and plus some other design
19 refinements, we continue to have a dialogue,
20 interaction with the Staff, and look to resolve their
21 questions and concerns, which drives a lot of the
22 changes, as well. So, that's really what's driving
23 it, closing out the COL holder, addressing the DAC
24 issue, carrying on through design refinement
25 finalization, and then resolving Staff issues and

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1 concerns.

2 MEMBER BONACA: Okay.

3 MEMBER BLEY: Just to follow-up on, as you
4 go through these things, especially electric power,
5 for me, if whoever is presenting that could give a
6 hint of why some of these changes were made, that
7 would be helpful.

8 MR. SISK: We'll keep that in mind, as we
9 go forward. Okay. Without further delay, then, I
10 will turn it over Bob Seelman, and we'll go into
11 Chapter 8.

12 MR. SEELMAN: Okay. Thank you, Rob.
13 Thank you, Mr. Chairman, Members of the ACRS. My name
14 is Bob Seelman. I'm going to be presenting the
15 changes, the major changes to Chapter 8, Electrical
16 Power. To my right is Mark Demaglio, he's the subject
17 matter expert.

18 COURT REPORTER: Sir, can you speak into
19 the microphone.

20 MR. SEELMAN: All right. First, I'd like
21 to provide just a brief overview, the basis of the
22 AP1000 Electrical Design. AP1000 Electrical Design
23 does not require Class 1E alternating AC current
24 electrical power, except that provided by the Class 1E
25 direct current batteries and their inverters to

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1 accomplish the plant safety-related functions. The
2 changes from DCD 15 of the certified design to DCD 17,
3 included basically three major changes to the chapter,
4 on-site power systems, containment electrical
5 penetrations, reactor cooling pump breakers.

6 In terms of NRC guidance, the AP1000
7 Electrical Design conforms to the reg guides, and the
8 Class 1E IEEE standards. And with that, I'll go into
9 the first major change.

10 The first major change is a change added a
11 fast bus transfer. The benefit of adding a fast bus
12 transfer derived from adding additional transformer
13 that includes -- the benefits include avoid reactor
14 trip due to component failure or spurious actuation of
15 the protective relaying. Second benefit allows
16 complete bus transfer from the unit auxiliary
17 transformers to the reserve auxiliary transformers.
18 Those are the two primary benefits of why this change
19 was made. The Staff listed this particular item as a
20 confirmatory item.

21 MR. CUMMINS: Maybe I can make a comment.

22 Ed Cummins. This change was a change which was
23 driven by our customers, and Rob did mention that
24 source of changes, but that was another source of
25 changes, as you get customers, and they organize in a

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1 group. They have proposed changes, and we evaluate
2 them together. And, basically, we designed the AP1000
3 in accordance with Utility Requirements Document, two
4 UATs, Unit Auxiliary Transformer, and one reserve
5 transformer. And that's a little different than
6 operating plants. Operating plants have -- need more
7 reliable AC power, and they're used to having --
8 they're used to having two UATs and two RATs so that
9 you can run the plant on either UATs or the RATs, that
10 if we have a failure, they can transfer. So,
11 customers wanted it, and we found it to be an
12 improvement in safety, a small improvement in safety,
13 and no reason not to do it. So, we implemented it.

14 MEMBER BANERJEE: Are you making a similar
15 change in your plants in China?

16 MR. CUMMINS: Yes. The idea is that the
17 plants in China be the same as the plants here.

18 MEMBER BANERJEE: So, all the -- several
19 of the changes that you're making are already going to
20 be in the Chinese plants by the time -

21 MR. CUMMINS: Yes, they are. And we may
22 have an exception or two. I don't believe we have an
23 exception in this Chapter 8. They have, we
24 understand, a 50-hertz AC system with a different
25 voltage, but yes, the battery voltage, and other

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1 changes were made in China, as well.

2 CHAIR RAY: Okay. Well, that's a very
3 helpful insight, because the inference is that the
4 certified design wasn't -- this wasn't an error or
5 omission in the certified design. I guess it would
6 have worked as certified, but the benefits, as you say
7 -- for example, I'm not expert enough to understand
8 how an incomplete bus transfer would have been
9 problematic. Can you explain that a little bit more?

10 MR. CUMMINS: Well, I think Mark will go
11 into that, but, basically, the concept is that if you
12 have any problem that is on the ISO-phase bus, or on
13 the common line between the unit auxiliary
14 transformers, if you had a short, or any kind of
15 problem there, you would not be able to operate the
16 plant, and you would have really capacity only to have
17 half of the AC power loads of the plants supplied by
18 one RAT. When you have two, you have the capability
19 of operating the plant, and, hopefully, even
20 preventing a trip of the plant. Mark, I'll go to you
21 now.

22 MR. DEMAGLIO: The original design of
23 Revision 15.

24 CHAIR RAY: Introduce yourself, first.

25 MR. DEMAGLIO: Oh, sorry. I'm Mark

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1 Demaglio. I'm the Electrical Engineer working with
2 the AP1000 project.

3 COURT REPORTER: Speak directly into the
4 microphone.

5 MR. DEMAGLIO: Try again?

6 CHAIR RAY: We apologize.

7 MR. DEMAGLIO: That's okay. In the
8 original Revision 15 design, there was no automatic
9 bus transfer feature, at all. The reserve source was
10 truly a maintenance source. With a dead bus transfer
11 the plant would come off of line, and you would select
12 either the odd group, or the even group of non-safety
13 buses to transfer to the reserve source, so it was a
14 true reactor trip/turbine trip scenario. You'd come
15 down. You'd have a maintenance source available. The
16 addition of the fast bus transfer, hopefully,
17 precludes that reactor trip on faults in the zone of
18 protection.

19 CHAIR RAY: Thank you.

20 MR. SEELMAN: Okay. Thank you. Bob
21 Seelman, Westinghouse. The next change is the change
22 in the Class 1E DC distribution. This is a change in
23 system voltage loads from 125 Adc to 250 Vdc. The
24 change in voltage allows us to reduce cable sizes,
25 while still providing the required power. This is a

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1 change to Tier 1 section of the DCD. Any questions?

2 CHAIR RAY: What experience is there with
3 a 250 versus 125?

4 MR. SEELMAN: Mark Demaglio.

5 MR. DEMAGLIO: Experience with the 250
6 versus the 125 in nuclear power plants, and the
7 existing GA fleet, they do use both voltages for DC
8 motor-operated valves. They use them as reactor
9 building LOV boards, but there is experience in the
10 industry with component use, and batteries supplied at
11 this voltage. And it's probably a little more
12 limited, and is probably more focused on using
13 batteries as truly a motor source versus just a
14 control source, and we are using them, obviously, as a
15 motor source.

16 MEMBER BLEY: I think if you look outside
17 of strictly nuclear experience, you'll find quite a
18 bit.

19 MR. DEMAGLIO: Yes, sir.

20 MR. SEELMAN: Thank you, Mark. Okay. The
21 third change in the on-site power system, and the last
22 change in that section, is a change in the non-Class
23 1E DC and UPS system. Reduce your subsystem to
24 provide greater flexibility to service a non-Class 1E
25 version of the DC and UPS systems. This is also a

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1 Tier 1 change. Mark, do you want to add the benefits
2 of the why.

3 MR. DEMAGLIO: The design as it evolved
4 was evaluated. We began looking at the actual loads,
5 particularly the loads of the turbine generator
6 motors, evaluated those, and were able to determine
7 that the original configuration of three system level
8 UPSs, and a fourth DC system that was largely
9 dedicated to those motors was inadequate at 250 volts.

10 I'm sorry, inadequate at 125 volts DC. We added a
11 fifth battery in the turbine building area. It is now
12 dedicated solely to the turbine lube oil pump and
13 hydrogen seal oil pump, the DC emergency pumps, as
14 they're referred to. And took the advantage, at the
15 same time, to take what had been the fourth battery as
16 only a DC system, and fully implement it as a full UPS
17 system, allowing flexibility of two full load groups
18 of non-1E DC UPS. Whereas, we had a Battery 1, 2, and
19 with UPSs on them, inverters on them, we implemented,
20 or supplemented that to a fourth full UPS system, and
21 added flexibility capacity in that system by doing
22 that.

23 MR. CUMMINS: This is Ed Cummins. If I
24 would characterize the cause of this change, in design
25 finalization we figured out that we couldn't really

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1 run lube oil pumps from the battery as we had it
2 designed, so as we thought about the possible changes,
3 we decided to keep the battery and use it for, I'll
4 say control functions, and install a new battery close
5 to the diesel oil pump that would adequately handle
6 the demand for the diesel oil pump, for the lube oil
7 pump.

8 CHAIR RAY: Okay.

9 MR. SEELMAN: Thank you, Ed. Bob Seelman
10 from Westinghouse. The next change deals with
11 containment electrical penetrations. We change the
12 module separation criteria to allow conductor modules
13 in the penetrations of the same service class. This
14 is a Tier 2 change that affects Tier 1. And I'd again
15 defer to Mark to explain the -- expand on the why of
16 that.

17 MR. DEMAGLIO: What we actually did --
18 what we did here was realized that we were not
19 intending to use a given penetration to accommodate
20 service levels, different service levels of the
21 cables, and we had identified a criteria by which we
22 would be utilizing ground barriers, isolate different
23 service levels within a same penetration assembly. We
24 do not do that other than within our what we call it
25 low-voltage power and control, but for those in the

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1 same, and do not specifically require a barrier
2 between those in accordance with the standard.

3 We had had a statement that we would use
4 additional separation within an assembly. We are not
5 going to use one assembly to handle more than one
6 service level, other than the allowance for the
7 controlling below power, which do not require
8 grounding, so we removed that provision, that
9 restriction.

10 CHAIR RAY: Dennis, anything?

11 MR. SEELMAN: Okay. Thank you, Mark. The
12 final change I'd like to present, the final major
13 change involves reactor cooling pump breakers. We add
14 the breakers to each variable frequency drive to
15 permit servicing in the variable frequency drive
16 without taking the reactor cooling pump off line.
17 Mark, would you like to give additional whys on that.

18 MR. DEMAGLIO: Sure. As you know, the
19 AP1000 is licensed to operate with the reactor coolant
20 pump variable frequency drives in bypass during normal
21 operation, when the reactor trip breaker is closed.
22 We've always had the bypass breaker in the design.
23 What this did was added an input and output isolation
24 breaker, in addition to the bypass breaker. This was
25 done in discussion with our supplier, the supplier for

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1 the variable frequency drive. It allows you to
2 completely isolate the drive while you're in plant
3 operation for 18 months, and do any service or
4 maintenance you desire to on the machine. Again, the
5 drive is already in bypass during normal plant
6 operation, and is only used for startup and shutdown
7 in the United States. In China, that is slightly
8 different design.

9 MR. SEELMAN: Okay. Thank you, again.
10 One final note on that one. As a Tier 2 change, it
11 impacts Tier 1 of the DCD. Are there any other
12 questions now before I proceed with the open items?
13 Okay. I'll turn through the open items.

14 There are approximately six or seven open
15 items. The first one is confirmatory item, the fast
16 bus transfer. This confirmatory item was addressed in
17 the discussions on the first major change with the
18 fast bus transfer. This issue has been resolved with
19 the Staff.

20 The second open item - let me clarify
21 that. The first was confirmatory. It was not an open
22 item. The second item is an open item, EEB-03, load
23 profiles. These deal with the load profiles on the
24 24/72-hour batteries. The profiles will be available
25 in the first quarter of 2010.

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1 The next open item, 04, provide a
2 qualification test program for the 24/72-hour
3 batteries. This document, a draft of this document
4 was presented to the NRC, or given to the NRC back in
5 August of '09. Westinghouse currently has an action
6 to set up a meeting with the NRC to discuss that
7 document, and obtain NRC comments to that document.

8 We move on to 05, EEB-05, next slide.
9 Excuse me. EEB-05 addresses a number of calculations,
10 including battery sizing, terminal voltage, short
11 circuit calcs, motors draw for safety-related
12 batteries. These calcs will be available also in the
13 first quarter of 2010, when we expect to have -- we
14 plan to have the design review.

15 And, finally, or second-to-last open item,
16 EEB-08. I'll just read through the statement on the
17 open item. "Explain how Westinghouse will insure
18 consistency and transfer of design information to the
19 Applicant related to voltage regulation ratings for
20 equipment such as circuit breakers, and assumptions
21 used to determine equipment sizing." Westinghouse's
22 response to that open item is, "Non-safety design
23 calculations, including plant ETAP analysis will be
24 transmitted to the COLA with plant finalization
25 document turnover as part of a configuration control

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1 process. These design calculations will include the
2 design inputs, assumptions, methodology, acceptance
3 criteria used in the development of the sizing basis,
4 settings, low-flow, short circuit, and voltage
5 regulation." Just a note, there's a typo in the
6 second paragraph in that response, and that should
7 read low flow.

8 MEMBER BLEY: I understand how these
9 things work. That leaves this as a DAC item. Is that
10 right?

11 MR. SISK: No, sir. We do not see this as
12 a DAC item right now. We do not have DAC in Chapter
13 8. We are hoping to resolve these issues working with
14 the Staff, and resolve these open items.

15 MEMBER BLEY: Before -- okay. All right.
16 It will be transmitted with a COLA that is -- that
17 will be done before the design cert is complete. Go
18 ahead.

19 MR. SEELMAN: Okay. Finally, the last open
20 item, EEB-09, addresses voltage transients on the AC
21 systems. I'll read the statement, again. "It is
22 necessary that the safety-related battery chargers and
23 inverter trips to be coordinated, such that the
24 associated inverters do not trip during voltage
25 transients on the AC distribution system." And

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1 Westinghouse's response to this is, "The AP1000
2 recognizes the need for voltage protection, that
3 battery chargers and inverters in accordance with IEEE
4 446. Westinghouse will require suppliers to provide
5 protection that coordinates the input voltage
6 protection of the charger and the inverter." Any
7 questions?

8 MEMBER SHACK: Well, this is one of those
9 changes, it seems to me, how is this different from
10 the earlier versions of the Design Control Document?
11 And this seems like a design issue that should have
12 been resolved sooner.

13 MR. SEELMAN: We'll go to Mark on that.

14 MR. DEMAGLIO: I don't want to try to
15 speak for the Staff. We don't feel that the change we
16 made with regards to the voltage here from 125 to 250
17 changed the way in which this question is asked, or is
18 addressed. This was something that we would always
19 do. The only difference, of course, would be the set
20 point on the real numerical basis will change, but on
21 a per unit basis it will still be the same set point.

22 MEMBER SHACK: It clearly has to be
23 reviewed, once you've changed that voltage.

24 MR. SEELMAN: Okay. The next slide
25 contains the conclusions. Staff review of Chapter 8

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1 Electrical Power resulted in 11 RAIs. Westinghouse
2 has responded to those RAIs. There are currently five
3 open items, and two confirmatory items, which have
4 been resolved. And, finally, the last two slides on
5 this package contain sketches that show load flows
6 from the off-site power through to the battery
7 chargers. Unfortunately, the first slide is a skinny-
8 downed version of 11 by 17, so it's kind of difficult
9 to read. And Mark can certainly walk you through
10 these, if you'd like. And the second slide takes you
11 into the battery chargers sketch. Any questions?

12 CHAIR RAY: Questions of the members?
13 Well, we are precisely, as close as we ever get, on
14 time. So, we can proceed with the Staff.

15 MS. MCKENNA: Okay. Can we bring up the
16 Staff slides? David Jaffee, the Project Manager for
17 this chapter will start off the presentation, and he's
18 joined at the front table with Om Chopra, who is the
19 lead technical reviewer on this topic. I'll introduce
20 also Ronaldo Jenkins, who's the Branch Chief of the
21 Electrical Engineering Branch. We somehow failed to
22 get him a tent card, so we don't want him to be
23 incognito here.

24 CHAIR RAY: Thank you.

25 (Off the record comments.)

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1 MR. JAFFEE: Good morning. Sorry about
2 the difficulty with the slides. My name is Dave
3 Jaffee. I'm Project Manager in NRO reporting to
4 Eileen McKenna. I'm here in the capacity of Project
5 Manager for Chapter 8. Okay. I'd to introduce Om
6 Chopra, who is our Principal Reviewer for Chapter 8.
7 He'll be presenting for the Staff. Also, we have this
8 morning with us Ronaldo Jenkins, who is the Chief of
9 Electrical Engineering Branch.

10 The Staff had previously prepared a safety
11 evaluation for Chapter 8 for the Design Certification
12 in that that reflected Amendment 16 to the DCD.
13 Subsequently, the Staff received Revision 17 to the
14 DCD, and we reviewed those changes, and provided an
15 updated safety evaluation report that we made
16 available to the Subcommittee. We marked that up in
17 such a way that we hope to identify where the changes
18 were going from Rev 16 to Rev 17 of the DCD.

19 As Westinghouse previously indicated, we
20 had two confirmatory items that were resolved. And
21 those confirmatory items represented changes that
22 Westinghouse had proposed to the DCD. And when
23 Revision 17 arrived, we confirmed that, in fact, they
24 had made those changes. But, as a result of our
25 review of Revision 17, we found that there were five

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1 open items, all associated with the change from 125 to
2 250 Vdc in the DC power systems. Om Chopra will now
3 address Chapter 8.

4 MR. CHOPRA: I'm Om Chopra from Electrical
5 Engineering Branch, Office of New Reactors.
6 Basically, my presentation is the same, what you just
7 heard this morning from Westinghouse. And I'm going
8 to go over the same things that you have already
9 heard. And here is an overview. In Section 8.2, off-
10 site power system, they added two new transformers,
11 one reserve auxiliary transformer, and one unit
12 auxiliary transformer. They also incorporated a fast
13 bus transfer scheme. And on the on-site power system,
14 they revised nominal power rating of various pieces of
15 equipment, and updated diesel generator loading
16 tables. And they also replaced a diesel-fired
17 auxiliary steam boiler with a electric steam boiler.

18 And in DC power system, they changed the
19 system voltage for the operation of Class 1E Adc loads
20 from 125 volts DC to 250 volts DC. And electric
21 penetration area is still different. I thought this
22 item was most significant because the non-safety-
23 related penetrations were not originally listed as
24 qualified for harsh environment. So, the Staff had a
25 concern, and sent a RAI to Westinghouse, and,

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1 subsequently, the non-safety-related Class 1E
2 penetrations were included in the list of qualified
3 equipment.

4 And in the reactor coolant pump, they
5 added input and output isolation breakers to each RCP
6 pump variable frequency drive. The next one.

7 Now, the purpose of the -- they just
8 explained this morning, the purpose of the fast bus
9 transfer is to make sure if you have any fault in the
10 auxiliary transformers, or ISO phase bus, you don't
11 trip. You can transfer all your reactor coolant pump
12 buses to the unit, to the reserve auxiliary
13 transformer, and maintain operation.

14 This bus transfer scheme also provide
15 additional plant availability, and enhances the off-
16 site power supply to the battery chargers. Next
17 slide.

18 Now, they added two isolation breakers.
19 This is mainly to perform maintenance without tripping
20 the reactor coolant pump. And diesel generator,
21 again, they made some load changes. However, we
22 verified that all automatically loaded loads are still
23 within the rating of the diesel generator, so it
24 really did not affect any safety systems.

25 In the boiler design, originally, they had

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1 a diesel-fired steam boiler, and they are replacing
2 that with an electric steam boiler in order to reduce
3 the size of the boiler. So, this necessitated another
4 -- addition of another third auxiliary transformer.
5 Again, this is a non-safety-related change that they
6 have made. Next slide.

7 In the DC system, they changed the system
8 voltage, instead of 125 voltage DC, to 250 volt DC.
9 And we had five open issues. And what I heard this
10 morning is that this information is going to be
11 available to the Staff at the end of this year, or
12 early next year. And we will report our findings when
13 we get the information back from Westinghouse. Next.

14 The same thing with these two items. The
15 -- I think I heard that this information on the AC
16 system, as well, will be provided to us at the end of
17 this year, or early next year. And we will report our
18 findings on that, too. That concludes my
19 presentation.

20 CHAIR RAY: These qualification test plans
21 and so on, they presume to have some connection,
22 ultimately, with surveillance testing, or technical
23 specification requirements for maintaining the
24 capability of the batteries for the life of the plant.

25 In other words, does this translate to requirements

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1 that verify the capability of the batteries during the
2 life of the plant, discharge test, whatever the
3 appropriate -

4 MR. CHOPRA: Yes. They -- according to
5 the technical specifications, these batteries have to
6 be tested periodically to demonstrate their ability to
7 power the loads.

8 CHAIR RAY: These qualification tests
9 will, at least in principle, affect the surveillance
10 test program, in terms of what the requirements of
11 that program are.

12 MR. CHOPRA: Well, Westinghouse has
13 submitted a draft report, how they are going to
14 qualify these batteries for this service, because
15 these are long-cycle batteries, 72-hours, and 24-hour
16 batteries, and there is no standard, IEEE standard
17 that really qualifies battery up to -

18 CHAIR RAY: I guess that's what I'm
19 groping here, but, basically, because of that, what
20 you just now said, my thinking goes to -- well, how
21 would this same performance be assured 20 years into
22 the plant life?

23 MR. CHOPRA: By periodic testing.

24 CHAIR RAY: They don't have to have some
25 kind of in-service testing.

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1 MR. CHOPRA: Yes. Periodically, every 18
2 months, or 24 months.

3 CHAIR RAY: Does that have to be developed
4 now, the way this will be verified after 20 years?

5 MR. CHOPRA: It's normally in the
6 technical specification, that they have a battery
7 service test, and they have a battery discharge test.
8 They are already in the tech specs.

9 CHAIR RAY: And that will suffice.

10 MR. CHOPRA: Yes.

11 CHAIR RAY: That will suffice.

12 MR. CHOPRA: Yes.

13 CHAIR RAY: Okay. Any questions? All
14 right. Does that conclude Chapter 8?

15 MS. McKENNA: That concludes our Chapter 8
16 discussion, if there's no more questions.

17 CHAIR RAY: All right. Any follow-up from
18 the Applicant, anything you want to say on Chapter 8?

19 MR. SISK: No, sir. As indicated, we do
20 recognize that we have a little bit more work with the
21 Staff to close out these items. And, as indicated
22 throughout the rest of the year, first part of next
23 year, we're going to be working to close out the rest
24 of these open items.

25 CHAIR RAY: Okay. All right. I'm going to

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1 anticipate that we may spend some more time than we've
2 allotted here to the -- what's shown on the green
3 sheet here, agenda, as Item 7 later in the day. So, I
4 think we should take advantage of any opportunity that
5 we have to advance things as we go, and give ourselves
6 some more time, if we can, at that point in time.

7 Chapter 18 is the next discussion.

8 MS. McKENNA: Yes.

9 CHAIR RAY: And we're 15-minutes before
10 the scheduled break. Item 18 is scheduled for an
11 hour, so I'm going to ask that we go ahead and break
12 now for 15 minutes, as planned, and resume at 10:15.

13 (Whereupon, the proceedings went off the
14 record at 9:56:33 a.m., and went back on the record at
15 10:13:29 a.m.)

16 CHAIR RAY: Could we, again, come to
17 order. Again, I'm trying to take advantage of time
18 opportunities in order to expand, if need be, Item 7
19 this afternoon. We have the benefit of additional
20 members here that were not at the July meeting. I
21 want to give them an opportunity to pursue any items
22 of interest to themselves, as well as hear from the
23 Staff, as planned. So, I'll continue to try to take
24 advantage of time opportunities.

25 We have, during the break, passed out, and

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1 before us now, the Westinghouse presentation on
2 Chapter 18, which I presume we're ready to begin with,
3 Rob. Is that correct?

4 MR. SISK: Yes. Thank you, Mr. Chairman.

5 We're prepared to talk about Chapter 18, the HFE
6 issues. And for that, I'd like to turn it over to Mr.
7 Paul Hunton, our Program Manager, and Julia Reed, our
8 Human Factors lead to walk us through it. Paul.

9 MR. HUNTON: Thank you, Rob. Thank you,
10 again. My name is Paul Hunton, and I'm the Program
11 Manager for AP1000 Electronic Systems, and Human
12 Factors. And both Julie and I appreciate the
13 opportunity to be in front of you today, and to
14 describe for you the efforts we have been pursuing
15 since design certification of Chapter 18, the Human
16 Factors portion of the AP1000 DCD.

17 So, moving on to the first slide. Okay.
18 First of all, I'll just provide a general overview of
19 Chapter 18, what is driving Westinghouse efforts, and
20 then going to move particulars as to how it applies to
21 the DCD. So, our governing NRC guidance is the Human
22 Factors Engineering program. We have two revisions of
23 that document, the initial revision in July 1994, and
24 Revision 1, May 2002, essentially lay out what is
25 expected by the NRC Staff for the Human Factors

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1 program for a new plant.

2 In addition to that, we have the Human
3 System Interface Design Review Guidelines, NUREG-0700.

4 Now, NUREG-0711 specifies that a style guide be
5 generated for use in the development of Human System
6 Interface Resources, and that is NUREG-0700 provides
7 generic guidance that the NRC Staff provides. NUREG-
8 0711 allows vendors to customize the information
9 provided in NUREG-0700, and generate a specific style
10 guide. And that's what we've done for AP1000. It's
11 described more in Section 18.8 of the DCD. And, the
12 Staff has found that style guide to be acceptable.

13 Okay. Moving to the next slide. This
14 slide depicts the elements of the certified HFE
15 program for AP1000. It lists the organizational
16 elements we need to do, operational experience review,
17 function requirement analysis and allocation, task
18 analysis, staffing, integration of Human Factors
19 Analysis with Human Factors Engineering, Human System
20 Interface Design, procedure development, training
21 program development, verification, validation,
22 inventory, design implementation and Human Performance
23 Monitoring.

24 Now, when the AP1000 design was certified
25 in Rev 15, many of these program elements were fully

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1 addressed. So, go to the next slide. So, our effort
2 since design certification have been to implement the
3 outstanding HFE program elements that remained in Rev
4 15 of the DCD. Again, in Human Factors space, the
5 program was certified, not the individual completion
6 of elements that were identified in the program. So,
7 obviously, since our work since the DCD Rev 15
8 certification is being used, credited to close the COL
9 information items, and the design ITAAC. Any
10 questions so far?

11 CHAIR RAY: Well, one of the questions I'm
12 thinking about here, you haven't mentioned DAC. Are
13 there no DAC involved?

14 MR. HUNTON: There are design ITAAC, DAC.

15 CHAIR RAY: Oh, that's what you mean by
16 Design ITAAC.

17 MR. HUNTON: Yes.

18 CHAIR RAY: Excuse me. So, I was thinking
19 the right thought. I just didn't see what I was
20 looking for. Okay.

21 MEMBER BLEY: They're not as easy to spot
22 here.

23 CHAIR RAY: Okay.

24 MR. HUNTON: Any other questions?

25 MEMBER BLEY: Well, what's your intention

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1 on how far you're going to go in closing design ITAAC
2 while this certification review is ongoing?

3 MR. HUNTON: It is our intention, as I'll
4 cover in the rest of the slides, to address all of the
5 open design items for Chapter 18, so that there are no
6 COL information items outstanding, and that the design
7 ITAAC are closed.

8 MEMBER BLEY: When this certification is
9 complete, this will be, in this area, anyway,
10 complete?

11 MR. HUNTON: Yes.

12 MEMBER BLEY: Complete package. Okay.
13 Thank you.

14 MEMBER SHACK: You're doing this with
15 these combined license technical reports. Those
16 become part of the Tier 2 information. They can't be
17 changed? I mean, changing them is like changing any
18 other pieces of Tier 2 information?

19 MR. HUNTON: I'd have to defer to -

20 mS. McKENNA: As a matter of fact, many of
21 these documents in Rev 15 were Tier 2*, and I think
22 that will be the case for some of them as they move
23 forward, as well. But I thought of this, that they
24 were Tier 2* because they were -- how they were going
25 to implement the program, and, therefore, the Staff

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1 wanted to have that level of control of what they
2 were. To the extent that the program was implemented,
3 they wouldn't be necessary.

4 MEMBER SHACK: Do you have an SER, for
5 example, for that task implementation document that
6 they have? You review and approve it somehow, but
7 what's the product, or -- I don't see it sort of done
8 in the SER.

9 MS. MCKENNA: I'll ask the Staff to
10 respond. Paul Pieringer, could you answer that
11 question?

12 MR. PIERINGER: This is Paul Peiringer,
13 Technical Reviewer. The -- I guess, I need to come
14 back to your last question, but the first
15 differentiation we make is an implementation plan will
16 always be Tier 2*. And that's defined by NUREG-0711.

17 The technical reports that I think Paul was referring
18 to are referenced in the design certification, and
19 they typically would be Tier 2. And they would be --
20 they would follow the change requirements for Tier 2,
21 which means that the Applicant could change those, if
22 they can pass the 50.59-type criteria that are in the
23 appendix to Part 52.

24 MR. HUNTON: And, to amplify that a little
25 bit, the analyses that we do, which the Staff is

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1 reviewing for adequacy, as you go through the life
2 cycle of an AP1000, there may be particular changes
3 that occur to the design, and we have to do re-
4 analysis. Well, those analyses would follow a 50.59-
5 type process, Appendix 8 analysis for 52.

6 MR. SISK: You'd have to change Section 8.

7 MR. HUNTON: Yes.

8 MR. SISK: But the answer to the question,
9 I think, Paul, you have it exactly right. This is
10 supplemental information that's used to support the
11 information in the DCD, and would be subject to the
12 change under the 50.59 -

13 MEMBER SHACK: But, for example, this OS2A
14 implementation plan, has that been reviewed by the
15 Staff? They refer to it, but you actually review and
16 approve it, or -

17 MR. PIERINGER: Yes, and that looks, to
18 us, like an implementation plan that deserves to be
19 Tier 2*. And this is, I guess I would call this late-
20 breaking inside on our part, we've been reviewing that
21 to make sure that the NUREG criteria are met.
22 Generally, anything we review against NUREG criteria,
23 that makes that document a potential candidate for
24 Tier 2*. And what we didn't do in our evaluation was
25 to make that decision of whether OSA-2, I'll call it a

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1 technical report right now, actually qualifies for
2 Tier 2*. I, personally, believe it does, based upon
3 the research that I've done, but I need to get some of
4 the other tech reviewers engaged in that review. And
5 we have not had the opportunity to communicate this
6 with Westinghouse yet, either.

7 MEMBER SHACK: Where is your review of
8 that document documented?

9 MR. PIERINGER: That would be in the SER.

10 MEMBER BLEY: So, if it says Tier 2*,
11 it'll be in the SER?

12 MR. PEIRINGER: There's two questions
13 there, I think. One is, our review results of that
14 document are in the SER. And you'll see, we
15 referenced the criteria, and then we provide an
16 evaluation of how OSA-2 met that criteria. The
17 designation of whether that document that communicates
18 the OSA-2 material needs to be designated in the SER
19 in the brackets with parentheses that say Tier 2*.
20 And it's that piece that's missing right now in the
21 SER, is that parentheses with italics.

22 MEMBER SHACK: So, that review is in
23 there, and I just missed it.

24 CHAIR RAY: Let me suggest something. You
25 guys are doing very good, and some of us here, in

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1 terms of esoteria of this, generally, but I'd like to
2 ask you to prepare to address this once again when it
3 comes your turn in this context, so you can think
4 about in the meantime, maybe. And we'll go over the
5 ground again, because I need to understand it a little
6 better, as well. So, with that, do you know where you
7 are?

8 MR. HUNTON: Yes, I know exactly where I
9 am.

10 CHAIR RAY: Okay. Let's resume, but with
11 the idea that we want to have a chance to talk with
12 the Staff a little bit more about this, without
13 distracting you too much.

14 MR. HUNTON: Next slide, please. This is
15 just a figure out of the DCD, which provides a good
16 outline of the Human Factors Engineering process for
17 AP1000. There are five major areas. The planning
18 analysis and design phases, pending acceptability
19 review from the NRC Staff we've shown as complete, as
20 well, the development of the verification and
21 validation plans. Next slide, please.

22 Okay. Chapter 18, Licensing and DCD Rev
23 17. Our objective in supporting DCD Rev 17, as I
24 stated earlier, was to provide sufficient information
25 to the NRC Staff to allow the Staff to close all

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1 Chapter 18 COL information items. And, as far as DAC,
2 to provide sufficient information to close items 1-4
3 from Tier 1, Section 3.2.1 of Rev 15 of the DCD. If
4 you look at Rev 15, it will list those first four
5 items. If you look at Rev 17, the first four items
6 from Rev 15 do not exist. Okay? Next slide, please.

7 Okay. This is just a list out of Rev 15
8 of the DCD of the Design COL Information Items. These
9 are the ones Westinghouse has responsibility to
10 address. And multiple technical reports and design
11 documents have been provided to the NRC Staff, as a
12 bases to close these COL Information Items, as we just
13 discussed. Okay?

14 So, this is -- I'm just going to now go
15 through an overview of all the COL Information Items,
16 and the DAC, as they relate to Chapter 18. So, for
17 the first COL Information Item, which was Execution of
18 the HFE program, the Staff has closed this item as
19 being redundant with design ITAAC. Essentially, all
20 the design ITAAC, all the other COL Information Items,
21 essentially, provide the objective quality evidence
22 needed by the Staff to determine that we are properly
23 executing the program.

24 We, also, did submit here the AP1000 HFE
25 program plan document number listed there. The

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1 purpose of that was to take the certified design --
2 the certified program in Chapter 18 of the DCD, and
3 to develop more in terms of a user manual, so that the
4 engineers who are actually developing the HSI
5 resources, and performing the Human Factors Analyses,
6 are able to implement that process with a clear set of
7 instructions, essentially written for them. Okay?
8 Any questions on 18.2.1?

9 Okay. The next one, Design of the
10 Emergency Operations Facility. This is still open.
11 It is Westinghouse's position that all the information
12 needed to close this Information Item from the
13 Westinghouse perspective has been provided to the NRC
14 Staff.

15 One of the issues here is we've been
16 working with industry, and the Staff to adjust this
17 COL Information Item. It really discussed two major
18 topics. One of them was the location of the EOF.
19 Well, the location of the EOF is really not a Human
20 Factors item, so we're working with the Staff, that we
21 don't reference the location. And the other has to do
22 with the degree to which the AP1000 HFE program
23 applies to the TSC, and to the EOF. Because the TSCs
24 for our customers may incorporate multiple plants that
25 aren't AP1000, the same with the EOF. So, working

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1 with the Staff, we've revised the COL Information
2 Item.

3 We also took an action to perform a task
4 analysis for the AP1000 actions that are required by
5 the TSC and EOF to insure that the Human Factors
6 elements are properly addressed for those AP1000-
7 specific actions. We have now provided that task
8 analysis to the Staff. And, again, it's
9 Westinghouse's understanding that we have addressed
10 the -- all of the information needed to address the
11 Westinghouse portions of the revised COL Information
12 Item. And, in our discussions with our utility
13 customers and the Staff, it's also Westinghouse's
14 understanding that our utility customers have
15 satisfied what they need to discuss concerning Human
16 Factors with regard to the TSC and EOF, so that
17 there's no additional work required to fully address
18 this Information Item. Any questions on that item?

19 Okay. Task Analysis. This task analysis
20 really deals with workload in AP1000. You do a
21 function-based task analysis, and then you do two
22 operational sequence analyses in the AP1000 certified
23 program. We've completed both of those operational
24 sequence analyses. OSA-1 was completed some time ago.
25 OSA-2 summary report was submitted earlier this year,

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1 which completely laid out our methodology, but it did
2 not fully address all of the different scenarios that
3 needed to be addressed by OSA-2. So, the Staff has
4 looked at OSA-1, and OSA-2, and has found the method
5 acceptable. But, since the OSA-2 task analyses, there
6 were some that were left out of the initial revision
7 provided to the NRC Staff, that those need to be
8 completed.

9 Now, capturing that those need to be
10 completed is actually taken care of in DAC, which I'll
11 discuss in just a minute. But the one open item here,
12 as far as the COL Information Item for task analysis,
13 is the final step is to take the results of the OSA
14 analyses, and to demonstrate how those results are
15 captured in the development of plant procedures, and
16 the development of the AP1000 training program.

17 Now, Westinghouse has identified that
18 these documents need to be produced. We have since
19 completed the OSA-2 analyses that we committed to the
20 Staff, and have provided a completed OSA-2 to the
21 Staff. And we are in the process of generating these
22 two documents listed here to fully address what is
23 necessary to close the COL Information Item on task
24 analysis. So, this is still an open item, and it is
25 our plan to provide the NRC's documents to the Staff

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1 in December of this year.

2 MEMBER BLEY: We'll look forward to seeing
3 those, ourselves. But can you tell me a little bit
4 more about the first one you list there. This will be
5 a task analysis that will, essentially, be the outline
6 of how the procedures will develop, or is it something
7 different?

8 MR. HUNTON: I'm going to defer to Julie
9 Reed to answer that question.

10 MS. REED: Julie Reed from Westinghouse.
11 The two documents written up there, they're not a new
12 analysis. It's more of a combination, and a
13 collection of results, and to present it in an
14 appropriate format to those that are responsible for
15 developing plant procedures, and those that are
16 responsible for developing the programs, the training
17 programs. And the training programs also do their own
18 form of task analysis. But these documents by virtue
19 of all the work that Human Factors has done, we wanted
20 to make sure that we got the results to the right
21 people. So, we go back through the Function-Based
22 Task Analysis, OSA-1, and OSA-2, and extract anything
23 that we think is relevant then to plant procedures and
24 training. We do them both in parallel. So, anything
25 like specific cautions that are implied, or perhaps

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1 more detail in the step, we note that down.

2 We not only look at the task analysis
3 documents, but we also go back and look at the OER,
4 the Operating Experience Review, and there are other
5 key inputs, as well. All of our engineering tests
6 came up with some findings that were relevant to
7 procedures and training. So, putting that information
8 together, explaining it as we can, and, if necessary,
9 to make it clear, and then forward it on to those
10 people that are responsible for those areas. And we
11 will do a lengthy revision, and I would anticipate
12 that the V&V exercises that we do later on will also
13 generate results we want to capture, and to
14 communicate to the relevant people within Westinghouse
15 and the utilities.

16 MEMBER BLEY: Can you tell us a little bit
17 about the extent of licensed operator participation in
18 the development of this work?

19 MS. REED: We have, with licensed operator
20 participation, Westinghouse, we have a number of ex-
21 operators, PWR operators that we -- that review and
22 participate in the work. And the engineering tests
23 use current licensed operators from all the different
24 utilities as subjects, so they're actively involved.
25 And we recorded performance, got subjective feedback,

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1 and measure workload, and had debriefing sessions.
2 So, we have a variety of different opportunities, and
3 different avenues for current licensed operators, and
4 people with operating experience contribute to task
5 analysis engineering tests. And they will be
6 reviewing these documents as they are produced.

7 MEMBER BLEY: Thank you.

8 CHAIR RAY: Dennis, could you mention to
9 Mike what -- you said we look forward to seeing these
10 reports when they come in in December, you were
11 referring to, I think. Is that correct?

12 MEMBER BLEY: Yes.

13 CHAIR RAY: I just want to make sure we
14 follow-up on that, Mike.

15 MR. LEE: 18.5-1, that task analysis?

16 CHAIR RAY: Yes. 18.j

17 MR. LEE: 18, I'm sorry.

18 MR. HUNTON: And, to go a little further
19 in answering your question about operator involvement,
20 we had a total of three man-in-the-loop tests, and
21 those are covered under ITAAC Number 3, engineering
22 tests summarizing outcomes of each man-in-the-loop
23 test. We committed in Rev 15 of the DCD to perform
24 two tests. We actually performed three.

25 The first test was, essentially, just a

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1 small-scale test to evaluate the use of soft controls,
2 and the displays, but the other two were, essentially,
3 using a limited scope simulator as an engineering
4 model. We used that device, and had two, essentially,
5 integrated tests with two groups of fleet operators
6 from industry, and went through a multi-day evaluation
7 of our HSI resources. And the purpose of that
8 evaluation was to, essentially, provide early design
9 input to insure that the HSI resources provided an
10 adequate interface.

11 MEMBER BLEY: Thanks. That's what I was
12 hoping you would tell us.

13 MR. HUNTON: Yes. Okay. Moving on
14 18.5.2., Main Control Room Staff, Roles and
15 Responsibilities. This item has been closed by the
16 Staff. The reference there is the Main Control Room
17 Staff, Roles and Responsibilities document, where we
18 went through the roles and responsibilities of
19 different stations in the control room. The purpose
20 there was to insure that the work stations had the
21 sufficient resources to allow the operator to perform
22 their function.

23 Okay. 18.7-1, Execution and Documentation
24 of the Human Reliability Analysis, Human Factors
25 Engineering Integration. This item has also been

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1 closed by the Staff. It's addressed by the program
2 plan, which I don't have the number listed there, but
3 it's in the Certified Design Rev 15. And then, we
4 have since provided 16555, which was the
5 identification of the critical human actions and risk
6 important tasks.

7 Now, the key attribute here is to identify
8 those tasks, and then to roll them into the
9 operational sequence analyses to insure that those
10 tasks are properly addressed in the HSI design. And
11 we have done that, and we have completed those two
12 analyses, and provided the summary reports to the NRC.

13 Okay. Next one is 18.8-1, which is
14 Execution and Documentation of the Human System
15 Interface Design Implementation Plan. Again, the
16 Staff determined that this was redundant with the DAC
17 item, DAC Item 3. And the DAC item talks about
18 functional requirements, design guidelines, which I
19 discussed earlier, design specifications, and the man-
20 in-the-loop test reports.

21 Okay. The next one, 18.9-1 is Procedure
22 Development. The SER shows this as being open,
23 currently. It is Westinghouse's understanding,
24 however, that we have provided all the information we
25 need to provide to close this item. The open item in

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1 the SER alludes to an audit of our computer-based
2 procedure program. That occurred on September 15th,
3 and it is our understanding that the Staff was fully
4 satisfied with what they saw during the audit, and
5 will use that audit report to close this information
6 item.

7 MEMBER BLEY: Mike, I don't -- we got a
8 lot of stuff, I might have missed it. I don't know
9 that we've seen that audit report.

10 MR. PIERINGER: It hasn't been produced
11 yet.

12 MEMBER BLEY: Oh, it hasn't been produced.
13 That's a good reason. Thank you.

14 MR. LEE: I infer, though, from your
15 observation it's something that the Committee would
16 like to -

17 MEMBER BLEY: Yes.

18 MR. LEE: Thank you.

19 MR. HUNTON: That would have been pretty
20 good to get that report done in two weeks.

21 All right. The next item, 18.11-1,
22 Verification and Validation of the Human Factors
23 Engineering Program. Again, the Staff found this to be
24 redundant with ITAAC, or DAC Item 4, which I'll
25 discuss more in just a little bit.

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1 So, that addresses all the COL Information
2 Items for AP1000, as we go from Rev 15 to Rev 17.
3 It's our position that when the Staff has reviewed all
4 the information that we either have submitted, or plan
5 to submit in the very near future, we'll have no more
6 COL Information Items.

7 As far as DAC status, DAC Item 1, again,
8 just integration of the Human Reliability Analysis and
9 Human Factors Engineering Design, closed, as I just
10 previously discussed. Okay. DAC Item 2, Task
11 Analysis is performed in accordance with the Task
12 Analysis Implementation Plan. As I discussed earlier,
13 this is where the Staff captures that they have yet to
14 complete their detailed review and document that
15 review for the second revision of OSA-2 summary
16 report. This revision addresses all of the analyses
17 that we've identified as being required. And that was
18 provided to the Staff last week, so we expect this to
19 be closed.

20 Next item. HSI Design is performed for
21 the operation control centers in accordance with the
22 HSI Design Implementation Plan. Again, functional
23 requirements, design guidelines, engineering tests,
24 and this lists design specifications. Now, in the
25 Staff's SER, they're satisfied with the increasing

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1 level of detail as we go from the functional
2 requirements to our specifications, but at the time
3 the SER was written, two outstanding documents
4 remained to be submitted to the Staff. Those are
5 listed here. Those were, also, provided to the Staff
6 last week, and pending a satisfactory review, they
7 will be -- this item will be closed, as well. Any
8 questions on that item?

9 Okay. Next one is DAC Item 4, HFE Program
10 Verification and Validation Implementation Plan, which
11 is Tier 2*, is developed in -- the programmatic level
12 description, at this point, is Tier 2*, but the plan
13 is developed in accordance with the programmatic level
14 description listed there of AP1000 V&V plan.

15 Now, Westinghouse has provided all five of
16 those documents that are listed, which are the test
17 support verification plan, the design verification
18 plan, the integrated system validation plan, Human
19 Error Discrepancy Resolution Process, and the Plan for
20 Human Factors Engineering, Human Systems Integration
21 at the time of plant startup to the Staff. The Staff
22 has found four of those five to be acceptable. The
23 remaining one, which is the Human Factors Engineering
24 Integrated System Validation Plan, we are revising
25 that, as we speak, to address RAIs we've received from

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1 the Staff. So, we are working to resolve those RAIs.

2 We're looking to have a face-to-face meeting with the
3 Staff to address their issues. And our intent is to
4 provide a revision of that document in the January
5 2010 time frame.

6 Currently, the Integrated System
7 Validation is scheduled to occur about two years from
8 now. So, some of the issues that we have here are
9 more timing issues, and real specific details as to
10 how we're going to perform the Integrated System
11 Validation, so we have some work here with the Staff
12 to reach agreement as to what things we can resolve in
13 the near term, and what things are going to become
14 clearer as we get closer to Integrated System
15 Validation. Okay. Next slide, please.

16 So, conclusion. Westinghouse is
17 performing all of our actions as we committed to do in
18 our Certified Design Rev 15. Of the COL Information
19 Items, six of the nine have been closed. The
20 remaining open ones have to do with procedure
21 development, awaiting the results of the 9/15 audit.
22 The EOF/TSC item we are just awaiting NRC review of
23 provided documentation. And the one COL Information
24 Item that we have documents still to provide are the
25 ones for training program, and procedure development

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1 based upon the OSAs. Last slide, please.

2 And as far as DAC, DAC Item 1 is closed, 2
3 and 3, we are expecting the Staff to close pending
4 satisfactory review of the documentation provided.
5 And number 4, we've completed four-fifths of what we
6 needed to complete, and have the Staff find
7 acceptable. And we're working on the ISV plan. And
8 that concludes Westinghouse's slides, with the
9 exception of here's a picture of our current AP1000
10 main control room, as it appears in the design.

11 CHAIR RAY: Okay. Questions from members?

12 Dennis, let me ask you on this one open item in DAC
13 here, that looks all right in terms of the timing?

14 MEMBER BLEY: I think so. I mean, I'm
15 really pleased to see that they're pulling this
16 together. I wish they'd be here at our meeting
17 talking about DAC later this week.

18 CHAIR RAY: Okay. Well, that's why I'm
19 wanting to focus a bit on that issue. We'll hear from
20 the Staff on the fifth out of the five items in DAC in
21 a minute, I guess.

22 Okay. Hearing no requests for further
23 information, we'll proceed with the Staff, which was
24 scheduled to occur after lunch, but we'll do it now,
25 if we may, Eileen, please. Go ahead.

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1 MR. DONNELLY: All right. Thank you, Mr.
2 Chairman. My name is Patrick Donnelly. I'm the
3 Project Manager for Chapter 18. To my left is Paul
4 Pieringer, he's the Lead Reviewer. You've already
5 heard a little bit from him this morning. Assisting
6 him was Molly Keefe and Jacqwan Walker. There was a
7 question earlier this morning about going from Rev 15
8 to 17, how -- making sure that the changes were, as
9 far as the entire design, how that worked out, and
10 making sure that everything came together. And we
11 understood how the changes changed the design as a
12 whole. And Jim Bongarra was the person who reviewed
13 Rev 15, and he was used as a consultant in this role.

14 In addition, we had contractor support from Jim
15 Higgins, and John O'Hara, and they were reviewers and
16 consultants during the review. And I'll turn it over
17 to Paul.

18 MR. PIERINGER: Good morning. I'd like to
19 start first by going through objectives, and giving
20 you some background on what we are looking for in the
21 evaluation. First of all, NUREG-0711 is divided in
22 four sections, and a support slide at the very end of
23 your package, you'll see an outline of those four
24 sections. But, in brief, they're planning and
25 analysis, design, V&V, and implementation and

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1 operation. And I'll refer to those four sections as
2 we go through here.

3 Our first objective was to make sure that
4 implementation plans, and result summary reports for
5 the planning and analysis phase elements were
6 completed. Now, that was important to us, because
7 it's this planning and analysis phase that is
8 identifying design inputs to the subsequent design
9 phase. And what we wanted to do was insure that
10 design inputs, as best could be done in a DAC ITAAC
11 area where completed.

12 We recognize the design process has an
13 iteration cycle to it, so things you discover at the
14 end come back and affect that design. But the intent
15 was, in our review, is to reach completion on this
16 planning and analysis phase. That includes things
17 like operating experience review, function analysis,
18 task analysis, and the HRA.

19 CHAIR RAY: Can you explain how your
20 objective is different with regard to Rev 17, than it
21 was with regard to Rev 15?

22 MR. PIERINGER: Yes, sir. The Standard
23 Review Plan defines three levels, programmatic,
24 implementation plan, and results. And Rev 15 was
25 submitted at the programmatic level. What we've

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1 learned is that when you get a programmatic submittal,
2 it, basically, outlines the commitments that are going
3 to be met. It's a set of promises. It doesn't tell
4 you how those commitments are going to be implemented.

5 And because it doesn't tell you how, it doesn't give
6 you very much detail in terms of acceptance criteria
7 that you can use to measure the ITAACs against. So,
8 when we came to this Revision 17, and when we've come
9 to the new design applications, what we are doing is
10 looking for an implementation plan level submittal,
11 because it provides that detail needed in the DAC
12 ITAAC area for measurable discrete acceptance
13 criteria.

14 CHAIR RAY: Okay. Well, this is a little
15 different take on what's happening in moving from one
16 certified design to an amended certified design,
17 because it's presuming a different standard, I guess
18 you would call Implementation Plan Standard, as
19 opposed to the Programmatic Standard, if I can coin
20 that. And that's part, I guess, of what we're trying
21 to understand here. We're not, necessarily, talking
22 about changes, except they are changes in the sense
23 that additional information can be thought of as a
24 change, I guess. Well, what you said was helpful. I
25 just have to mull it over a little bit further,

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1 because we're, as you may have heard already, we're
2 trying to understand, are we talking about changes,
3 are we talking about something else, as between 15 and
4 17. And you've helped clarify that. Thank you.

5 MR. PIERINGER: The subject also comes up
6 again in later slides, too. And, actually, it comes
7 up right now, because our next objective was to make
8 sure we had implementation plans for each of the 12
9 sections that are defined by NUREG-0711. And that's
10 for the purpose that I just described. We wanted
11 discrete measurable acceptance criteria for ITAACs.

12 MEMBER BLEY: Can I ask you a question
13 that's purely of interest to me? When Chapter -- I
14 mean, when Revision 15 was certified, you included a
15 set of DAC for addressing all these issues, the ones
16 you just spoke to, too.

17 MR. PIERINGER: Yes, sir.

18 MEMBER BLEY: Now that they're giving you
19 the detailed information and meat, you're going
20 through it, have you tried to play what you're looking
21 at now against those DAC and understand -- get any
22 feeling for how well those DAC could have established
23 the adequacy of these systems, if there hadn't been
24 the kind of review you're doing right now?

25 CHAIR RAY: Would they have sufficed, in

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1 other words?

2 MEMBER BLEY: Yes. Have you even looked
3 at them, and played them against your review?

4 MR. PIERINGER: Let's see. I'm trying to
5 restate your question a little bit. Would the Rev 15
6 DAC have sufficed?

7 MEMBER BLEY: If we came in -

8 MR. PIERINGER: My answer is yes, but the
9 COL applicants would have had a huge amount of work to
10 do, because the COL applicants would have had to
11 submit implementation plans. And those implementation
12 plans would have had to have been reviewed against
13 NUREG-0711. So, they would have been starting at a
14 very basic level, and would have had to develop a lot
15 of material.

16 Now, in this case, Westinghouse has
17 developed the implementation plans, and implemented
18 the implementation plans, so we're reviewing both
19 implementation plan and results report as part of Rev
20 17. That's the big picture on Rev 17 for Chapter 18.

21 MR. HUNTON: This is Paul Hunton. What
22 that does for us is, it promotes design
23 standardization. By accomplishing that, it not only
24 helps Westinghouse, but it, subsequently, helps all of
25 our customers.

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1 CHAIR RAY: Well, the nature of the
2 inquiry has generic implications not particular to
3 even factors, but it has to do with the adequacy of
4 DAC, full stop, to define a design. Okay.

5 MEMBER SHACK: But, on the DAC, you have
6 added no additional criteria. You have added no
7 additional criteria. The DAC worked as DAC were
8 expected to work, would you say?

9 MEMBER BLEY: But they're not actually
10 reviewing against the DAC, or are they?

11 MEMBER SHACK: Well, they -- I guess,
12 maybe now they don't have to. It is a DCD. They're
13 changing, so they don't have to do that.

14 MR. PIERINGER: There is a series
15 connection here. There are some DAC that we cannot
16 review until we get the implementation plan, which is,
17 itself, a DAC. So, if they were to give us an HSI
18 design X, and we didn't have the implementation plan
19 telling us what that design was supposed to be, and we
20 only had the NUREG criteria up here, we would have to
21 jump from the NUREG criteria, down to the design.
22 That's not a good jump, because there's a lot of
23 detail that you need in process space to tell you how
24 that process works, to make sure that the design is
25 complete. But we didn't have -

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1 CHAIR RAY: This is a generic issue, so
2 this is very helpful for us to hear you explain that.

3 But a minute ago you said yes, but the COL applicant
4 would have had to do a lot that he's not now going to
5 have to do.

6 MR. PIERINGER: He would have had to
7 prepare the implementation plans.

8 CHAIR RAY: But, would that have been
9 workable?

10 MR. PIERINGER: Well, that question gets
11 into, does the COL applicants know enough to write the
12 information plan? My opinion is no, that many of
13 these implementation plans, particularly in task
14 analysis space, were in the architect engineer arena.
15 And it needed the architect engineer's input. Now,
16 that's not to say that the COL applicants couldn't
17 have acquired that, so you could have made those
18 arrangements. But the way it worked out, in my mind,
19 was the most reliable, and the most cost-effective.

20 CHAIR RAY: Any other questions?

21 MR. CUMMINS: This is Ed Cummins. If I
22 could just maybe help a little bit here. The industry
23 has said that they would like these DACS or these
24 ITAACs to be specific, so that you could tell whether
25 -- any reasonable observer could tell whether you

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1 passed it, or whether you failed it. That is a very
2 hard standard for DACs, because it says sort of make a
3 plan, implement the plan, do a good job, all those
4 things are subjective kinds of things. So, I think
5 what you're seeing in the difference between the level
6 of the DAC, and the ability to make it subjective in
7 terms of whether somebody passes or fails, the more
8 information you put it in, the more you can have
9 general agreement of whether it was implemented
10 properly, or not implemented properly. And from the
11 risk to the ultimate user, the risk goes down, if it's
12 clear well, you pass or fail, the DAC or the ITAAC.
13 So, I think there's elements in -- the more general
14 you write the DAC, the less clear it is how you close
15 it, and the more possible for contesting, whether you
16 passed or failed to complete the DAC.

17 CHAIR RAY: Very excellent summary of our
18 thought process, as well. We hope to memorialize that
19 in the transcript, and revisit it, because that's a
20 good description of some of the concerns that we have.

21 This is an area where, obviously, the issue is being
22 addressed in the most effective way, as you said. But
23 that's not true everywhere. Okay. Are we ready to
24 proceed? Bill, you -

25 MEMBER SHACK: No, I was going to say, I

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1 think the point of your question was, suppose it had
2 been left to the COL, suppose we were working from DCD
3 15, do you think the DAC would have been sufficient
4 control for you to go through the implementation
5 plans? Were they in truly necessary and sufficient
6 conditions enough for a reviewer to then go on and
7 review the implementation plan? That turns out to be
8 a moot thing here, at this point, but on a conjectural
9 level.

10 (Simultaneous speech.)

11 MR. CUMMINS: It is true that that becomes
12 a DAC, it becomes the COL's responsibility, but it
13 doesn't mean that the COL has to implement that. And,
14 in fact, most of the DACs would have been -- they
15 would have expected the designer to implement it, and
16 required it as part of their contract, or part of
17 their agreement. And, they would have wanted to have
18 a standard answer for the whole fleet. So, they would
19 have passed it back to Westinghouse, and Westinghouse
20 would have, ultimately, done what we did. And what we
21 have done here by accomplishing it, is we've reduced
22 the risk of closing this vague DAC.

23 MEMBER SHACK: That's looking at it from
24 your side. From my side, I want to make sure the NRC
25 has enough -- has the box been made tight enough by

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1 those DAC?

2 CHAIR RAY: As I say, I thought he did a
3 very good job of summarizing our own questions here.
4 And, as you say, Bill, it is a matter that we need to
5 be satisfied, not just acknowledge that well, this
6 will get worked out by sending it back to
7 Westinghouse, anyway. We need to understand how these
8 things work better than we do, and that's why we spent
9 the time we have asking about this example. And, as
10 Bill said, it's a potential good test of the process
11 to ask the question, well, did the DAC turn out to be
12 sufficiently constraining on these implementation
13 plans that you're now reviewing, or not? And I'm not
14 sure what your answer is to that, but you don't need
15 to answer without thinking about it some more,
16 perhaps. Let's proceed.

17 MR. PIERINGER: Okay. Going to the next
18 slide. This is just a summary slide. I draw your
19 attention to the areas where there are no changes
20 documented. That just means that I won't be talking
21 about it for the rest of this presentation, because
22 Rev 15 is the same as Rev 17. I will talk about each
23 one of the other areas, specifically, as we move on.
24 So, I'll go to page 6, which starts with Section 18.2,
25 HFE Program Management.

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1 (Off the record comments.)

2 CHAIR RAY: Go ahead.

3 MR. PIERINGER: DCD Rev 17 added a new
4 reference. It was AP1000 HFE Program Plan. We
5 reviewed that program plan, and found that it did
6 support the existing safety conclusions that were made
7 in Rev 15. It was a document that provided more
8 detail on how the implementation plan was going to be
9 administered. And, specifically, it providing the
10 engineering staff with additional implementation
11 guidance, so we thought that it was an excellent step
12 in reaching a lower level of detail that the
13 engineering workforce could use to implement the plan

14 COL 18.2-1 asks the COL to execute or
15 implement the HFE program. We reviewed this, and
16 believe it to be redundant to the ITAACs, in general,
17 1-13. When I'm talking about ITAACs now, I'm using
18 the Rev 15 numbering system. And I'll draw your
19 attention to where I'm reverting, or going on to the
20 Rev 17, because they're renumbered in 17, so we have
21 to be a little careful here, make sure we're talking
22 about the same one. So, I'll be using Rev 15.

23 So, we closed that. To the ITAACs, in
24 particular, ITAAC 5 in Rev 15 speaks about the
25 verification and validation program. And, in

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1 particular, the way the HFE program works, as you
2 know, is we have a validation, which brings together
3 the actual design with the operators, with the
4 procedures, and with the training, and make sure that
5 those four things work together they way they're
6 supposed to be. And, besides that, we look at each of
7 the elements as they're executed. For example, we'll
8 look at task analysis, we'll look at the OE analysis.

9 So, we do those within ITAACs, making this ITAAC
10 redundant.

11 COL 18.2-2 discussed the HFE plan as it
12 pertained to the Emergency Support Facilities. I want
13 to talk about this a little bit more. Westinghouse
14 proposed a tailored approach for this, in which they
15 put heavy emphasis on operating experience, functional
16 analysis, and task analysis. Well, you'll recognize
17 that those three areas are directly from NUREG-0711.
18 We reviewed their submittals in each one of those
19 areas, and they did a real good job of taking the
20 criteria, the applicable criteria from NUREG-0711, and
21 translating that into an Emergency Operating Facility
22 construct, and applying it there. Now, like HRA
23 wouldn't be applicable to the design of an EOF
24 directly, so that was not part of this tailored
25 approach.

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1 And then they supplemented this approach
2 with actual observations at two different plants,
3 Harris and Summer, and they picked up, actually,
4 identified additional tasks, and verified that the
5 tasks they identified through procedural reviews are,
6 in fact, accurate. And then coming -- using that
7 information, they developed the HFE program that was
8 to be applied to the EOF.

9 Now, I will tell you that 90 percent of
10 this is covered within the AP1000 scope. Most of that
11 is dictated by the dictated by the controls, displays,
12 and alarms that have to be available in the Emergency
13 Operating Facility, and Tech Support Centers for their
14 functions to occur. However, there was 10 percent -
15 these are my numbers, they're not measured, or
16 anything, just a relative value - there was 10
17 percent, things like panel layouts, anthropomorphic,
18 off-site dose measurement, that were, in my opinion,
19 the responsibility of the COLAs. I don't think we had
20 a disagreement over that, but what happened is, in
21 AP1000 Rev 17, the actual COL Information Item was
22 changed so that it omitted that design responsibility
23 on the part of the COL applicant. We had a series of
24 requests for information exchanges, and from that, we
25 reached the conclusion that Rev 17 would be written --

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1 rewritten to include that responsibility for the COL
2 applicants. And we also took out the location, as
3 Paul referred to earlier, because there is no
4 dependency in HFE space for the location of the EOF,
5 for the Tech Support Center. So, at this point, that's
6 actually a confirmatory item. We're waiting to see
7 the -- we have an RAI response that we reviewed, and
8 we're waiting to see that incorporated into the design
9 certification.

10 The other part of an implementation plan
11 commitment was that the task analysis they did would
12 be documented, and that was to be done as part of the
13 OSA-2 task analysis. And, as reported earlier, that
14 work has been done, and the document was submitted on
15 9/28, and it's awaiting our review.

16 On the next slide, we talk about task
17 analysis, Section 18.5. And, in this case, Rev 17
18 deleted a description of a specific theoretical model
19 for operator workload, it's pretty much those words,
20 and they substituted a detailed implementation plan
21 for the Operational Sequence Analysis II. This is the
22 second iteration on the Operational Sequence Analysis.

23 It's part of an iterative task analysis process that
24 is described in the NUREG. And the detail there, the
25 processes used, the information that was being

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1 collected were all in line with what the NUREG
2 criteria advocated. And we considered that OSA-2
3 implementation plan a good plan, and it supported the
4 existing safety conclusions from the previous Rev 15.

5 COL Information Item 18.5-1, said that the
6 applicant was to conduct an HFE task analysis. As
7 reported earlier, the task analysis is done, with the
8 exception of documenting the training, and procedure
9 inputs. This is just a matter of completeness. And
10 those documents are due to be submitted in December,
11 and we'll review them at that time. That should close
12 that Information Item.

13 COL 18.5-2 is to define operator
14 responsibilities. Those were all defined in TR-52. We
15 found that acceptable. And then ITAAC design
16 commitment number 2 was to perform a task analysis.
17 You can note the similarity here with COL Action Item
18 in this case. We had the complete task analysis
19 implementation plan, that was judged to be
20 satisfactory. There was also results reports
21 submitted, I should say a partial results report
22 submitted. It was lacking the analysis of 24
23 maintenance, testing, inspection, and surveillance
24 tasks. The part that we reviewed was good. The tasks
25 had sufficient detail that you could, through

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1 analysis, identify controls, displays, and alarms that
2 were needed in the design. There was good
3 documentation, so the part of the work that we've
4 looked at is very satisfactory, and we're waiting for
5 completion. Actually, that work is completed now, and
6 submitted on 9/28, and waiting our review.

7 On the next slide, we move to Human
8 Reliability Analysis. COL 18.7-1 says the applicant
9 will execute the HRA Implementation Plan. This was
10 closed. Risk important actions were identified in
11 accordance with the implementation plan. And, more
12 importantly, and there should be another bullet here,
13 more importantly, those results were applied to other
14 portions of the HFE process. Most noticeably, that --
15 most notably, the task analysis procedures, training,
16 and staffing, and quals, where the results are
17 integrated into those parts of the program. So, that
18 COL item is considered closed.

19 ITAAC Design Commitment 1, Integration of
20 HRA activities with HFE is a similar activity. Again,
21 the implementation plan had already been considered
22 satisfactory. We were looking for integration. Well,
23 identification of the risk important tasks, and
24 integration of those tasks into the other parts of the
25 HFE program. And, in reviewing the task analysis, as

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1 I indicated earlier, we found excellent detail that
2 well supported the analyst's ability to identify
3 controls, displays, and alarms that needed to be
4 provided for in the HSI design.

5 In Section 18.8, the Human System
6 Interface Design, COL Information Item 18.8-1, says to
7 execute the HSI Design Implementation Plan. This is
8 closed. It's redundant -- considered redundant to
9 ITAAC 3, which I'll discuss in a minute. They also
10 introduced additional information in the, what I call
11 the style guide, in Westinghouse terminology is the
12 AP1000 HSI Design Guidelines.

13 In my opinion, this is a very important
14 part of the submittal that comes in under
15 implementation plan space, that's not in the program
16 space. The style guide, or the design guidelines.
17 It's basically the specifications on HFE design,
18 similar to what you'd find in NUREG-0700, talks about
19 height of letters, the colors you're going to use, the
20 details, the anthropometrics, and details on HSI
21 interfaces. And it is probably the largest piece of
22 the design plan that gives you specific auditable
23 information. So, we were very pleased to get that
24 style guide. It did integrate, and include all the
25 pertinent 0700 guidance, as well as a number of

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1 additional inputs from other industry documents. It
2 was, in my opinion, a very thorough integration of
3 information from various HFE sources, including the
4 information provided from the NRC.

5 Okay. ITAAC Design Commitment 3.

6 (Off the record comments.)

7 MR. PIERINGER: Okay. ITAAC Design
8 Commitment 3, Design Development. The way this is
9 characterized in design certification, is you start
10 with a series of generic requirements, functional
11 requirements, and those stem from that design analysis
12 and input phase that I described earlier. And what we
13 are interested in seeing here was the translation of
14 these generic functional requirements into specific
15 design specifications; specifications that were
16 specific enough that engineers could use them to
17 engineer from, regulators could use them to inspect
18 from, and purchasers could use to purchase from.

19 And we actually performed two audits in
20 this area. One was in October 2008. It was,
21 basically, more of what I'd call an Appendix B styled
22 audit, where we looked at procedure controls,
23 documentation controls, things of Appendix B nature to
24 make sure that what was in the HFE program was falling
25 under the appropriate controls, and we found no

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1 problems there. We did do a very quick review, where
2 we checked design functional requirements to verify
3 that those had been translated into specifications.
4 And we had a whole series of documents, and so we'd
5 spot check. We found no deviations there.

6 What we did find was that they had
7 developed a lot of specifications, many of which were
8 not specifically listed in the acceptance criteria for
9 this particular DAC, which is a good thing. The bad
10 thing was that they had not completed some of the
11 specifications that were listed on the acceptance
12 criteria, so we decided not to close this until those
13 specifications were completed. And, in fact, now
14 those have been completed, and are waiting for our
15 review. They were, also, submitted on 9/28.

16 CHAIR RAY: I wish I could capture what
17 you just said on a video, because it so perfectly
18 illustrates what we were talking about earlier, about
19 the insufficiency of the specifications in the DAC,
20 originally, and the fact that you waited to require
21 that the things that were listed in the DAC before
22 were completed, that were there. Because it's an
23 example of what we're wrestling with in our own mind
24 here about the ability to write DAC that's sufficient
25 to say that's it. Okay.

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1 MR. PIERINGER: And that first audit was
2 really just kind of a learning opportunity for the
3 Staff, when I look back at it. The second audit was
4 done in September 2009. It was specific to the
5 computer-based procedure system. We chose that area,
6 because, one, we had some questions in procedure
7 space, which we'll come to shortly, as to just how
8 this worked. Two, it's a new HSI application. I
9 don't want to say new technology, because the
10 technology has probably been there a while, but it was
11 a new application, and the Staff really wanted to see
12 how it worked in real life. So, we opted to go to
13 Westinghouse, ask Westinghouse to run their simulator
14 for us, so that we could actually see operators under
15 various scenarios, plus a scenario where they actually
16 failed the computer-based procedures, and we could
17 watch how that worked. We, also, brought Jim Higgins,
18 and John O'Hara with us from BNL to make sure we had
19 all the expertise to really evaluate the application
20 of this new HSI design.

21 What we found, I guess I'd say it was just
22 very insightful for us, because what we saw matched
23 very well with the specifications. And that's what we
24 were looking to do, is given these detailed
25 specifications, can we actually see how they've been

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1 translated into the working plant condition. And I
2 won't -- this was an engineering simulator, so it
3 wasn't a certified training simulator. And they
4 haven't completed all the programming for the
5 computer-based procedures. And there's still design
6 work to do on some of the interfaces, but it was the
7 first time we were able to actually look at a design,
8 compare it to the specifications, and say yes, we see
9 correlation. And then we did, actually, 100 percent
10 review of the NUREG criteria that applied to computer-
11 based procedures, and verified that all of those had
12 been translated into functional requirements. And
13 then, in turn, we took the functional requirements,
14 again, and verified that they had been internalized in
15 the specification level.

16 So, from that - now, this is a very narrow
17 piece. Right? It's only computer-based procedures,
18 but from that slice, we were able to show a complete
19 transition from the guidance, to the actual design
20 with all the documents in-between, having all the
21 appropriate documentation. So, we'd like to do a
22 couple of more of those audits, more on -- not just
23 for Westinghouse, but there's been plans submitted to
24 the Branch Chief to try and include that type of
25 evaluation, along with our review of the design

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1 certifications, as they come in. Yes, sir?

2 MEMBER BLEY: I believe this is -- is this
3 the first time Staff has been able to look at an
4 actual implementation of the ideas that were in NUREG-
5 0711 to see how they were all carried through to the
6 end?

7 MR. PIERINGER: It's the first time we've
8 done it.

9 MEMBER BLEY: Is there others scheduled
10 soon? This can become a confidence-builder and
11 process.

12 MR. PIERINGER: No, sir. There's no other
13 -- well, there's other -- we have other audits that
14 we've done to look at more of the paperwork, to
15 evaluate like the implementation plan, the
16 implementation plans reference other reports. I'm
17 speaking generically now, not just AP1000. And we've
18 gone to look at implementation plans, and then looked
19 at these reference reports to make sure that there's
20 sufficient information for us to do certain types of
21 reviews.

22 That's not what I'm talking about in this
23 computer-based procedure audit. And we don't have any
24 other audits similar to what I just outlined for
25 computer-based procedures scheduled. But that's where

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1 we'd like to be, but we have not scheduled that.
2 Maybe I should say, that's where I would like to be.
3 I have -- the Branch Chief is not here today, but he
4 likes the idea, but we haven't really a programmatic
5 approach to it yet.

6 Okay. Going on to the next slide. This
7 takes us to Section 18.9, Procedure Development. COL
8 18.9-1 was Execute the Procedure Implementation Plan,
9 which requires writers guides to be completed, which
10 they have been. And they were considered to be of
11 good quality.

12 This is where we had an open item to track
13 resolution of the questions associated with computer-
14 based procedures. Based on that audit, this open item
15 is being closed. The bullet I gave here is just an
16 example. This wasn't meant to be Westinghouse's
17 commitment. It's just to document what we saw while
18 we were at the simulator. But it looked like a
19 reasonable approach. It actually worked well in the
20 simulator. The operators were able to go to this
21 printer that was there, pull up the procedure, which
22 is kind of like a sequence of events, except it's
23 specific to procedure actions. It doesn't contain,
24 obviously, all of the controls -- all of the alarms
25 that are coming in. And the operators were very

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1 easily to take that and just continue to step down
2 through the remaining steps.

3 MEMBER BLEY: So, the plan is there won't
4 be an actual hard copy in existence? They'll print
5 out what they need, if this thing goes funny?

6 MR. HUNTON: There is a hard copy
7 available in the control room. And this is one
8 particular way to, if there's a fault in the
9 electronic computer-based procedure, that they can
10 transition to paper-based procedures. And what Paul
11 is saying, is this is one technical implementation.
12 There are others, which would include an electronic
13 file, which captures this, so you're not just
14 generating reams of paper. This is one way to do it,
15 but we are definitely exploring others.

16 MEMBER BLEY: Okay.

17 MR. SISK: There are procedures in the
18 control room.

19 MR. HUNTON: A hard copy set, and one of
20 the procedures in there is what do you do when the
21 computer-based -

22 (Off the record comments.)

23 MR. CUMMINS: This is Ed Cummins. I think
24 the point is to tell the operator once he shifts to
25 his paper, where he is.

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1 MEMBER BLEY: No, it makes sense, but -

2 MR. HUNTON: And that's the point, if he
3 knows exactly where he is, but doesn't have the book,
4 that would be a problem.

5 MR. PIERINGER: Yes. We were,
6 particularly, concerned about the transition, and
7 that's what we wanted to see, how place-keeping was
8 done during that transition. Yes, I'm done with that,
9 and moving on to Section 18.11, Verification and
10 Validation.

11 COL Information Item 18.11-1, Develop and
12 Execute A V&V Implementation Plan. We closed this.
13 We thought it was redundant to ITAAC Design Commitment
14 4 and 5. And I'll talk to those immediately here.
15 ITAAC Design Commitment 4 was develop V&V
16 Implementation Plans. Four of those have been
17 developed. I'm not going to go into -- they're good
18 plans. They're thorough. Where the real challenge in
19 this area is, is putting together a validation plan,
20 integrated system validation. That's the open item.
21 That's what I was referring to earlier, is where you
22 integrate the training procedures, operators, and
23 design. And we are -- I guess I would characterize it
24 as an excruciatingly detailed review of integrated
25 system validation. The NUREG-0711 criteria is very

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1 detailed. It requires scenario development, but not
2 just naming a scenario. You've got to put together
3 acceptance criteria. You've got to put together
4 situational factors. You've got to put together your
5 test plan, how you're going to measure it, how you're
6 going to train people.

7 And the submittals we've got up to this
8 date have all been too general in the integrated
9 system validation area. We are looking for a very
10 specific set of criteria, and that's what we're
11 working with Westinghouse right now, is getting to the
12 right level of detail. There are some areas we found,
13 particularly in scenario development, where some of
14 your acceptance criteria aren't available to you,
15 because they do depend on some design that hasn't been
16 -- some equipment design that hasn't been completely
17 determined yet. So, what we do have is the ability to
18 take a sample of scenarios, and review that sample.
19 So, that's our strategy here.

20 We do have a number of outstanding RAIs,
21 and this is always a challenging area, to get this
22 done, but I think we're in a -- we certainly, I think,
23 understand the expectations, understand where we're
24 headed here. We've got, I think, good communications
25 established on working out the details.

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1 And then the last one is an open item for
2 the Staff. I want to make sure that you're aware that
3 this is not a Westinghouse open item, this is a Staff
4 open item. There's an implementation plan they
5 provided us that talks about validating the installed
6 configurations during startup activities. It's a
7 short procedure. It's been reviewed. It is
8 satisfactory. I have to write up those results in the
9 SER. That's not done yet, so that's an open item to
10 the Staff.

11 So, to my conclusions, following closure
12 of the two open items on task analysis, Chapter 18 of
13 the Westinghouse DCD was satisfactory, addressed all
14 implementation plans, and result summary reports will
15 be complete for the planning and analysis phase of
16 NUREG-0711. In other words, all the design inputs
17 that are identified by the program will have been
18 completed.

19 Second conclusion, Chapter 18 of the
20 Westinghouse DCD provides implementation plan
21 information in sufficient detail to provide reasonable
22 assurance that the COL will implement an HFE program
23 that meets applicable regulation and guidance. In
24 other words, we have implementation plans that give us
25 sufficient level of detail, and prescription to be

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1 able to evaluate the designs as they are produced,
2 either by audit, or by the ITAAC that remain.

3 And Chapter 18 of the DCD, and the
4 associated ITAACs provide reasonable assurance that
5 the acceptable HFE practices and guidelines will be
6 incorporated into the COL plant design. In other
7 words, we have reasonable assurance of safety for the
8 HFE program. Any other questions I could answer?

9 CHAIR RAY: You have been very helpful in
10 many ways, but this issue that we've commented on a
11 number of times, which is the movement from the
12 programmatic phase, to the implementation plan phase
13 in this area is, obviously, a good step, and
14 completing it will be a significant milestone.

15 We want to learn from this experience all
16 we can. And not to -- probably not to question each
17 of the things that you've done, but just what
18 difference it makes in going from Rev 15 to Rev 17,
19 and what we can -- lessons we can draw from that, that
20 are generic to other things, as well.

21 So, anyway, that's my observation.
22 Anybody else have anything else they want to pursue
23 related to Chapter 18?

24 MR. PIERINGER: I had one IOU, and that's
25 to talk about OSA-2, and the discussion about Tier 2,

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1 Tier 2*.

2 CHAIR RAY: Yes.

3 MR. PIERINGER: On page 18-16 is specific
4 documentation on OSA-2. And that is on a criteria-by-
5 criteria basis.

6 CHAIR RAY: What was that page number,
7 again?

8 MR. PIERINGER: 18-16 in the SER.

9 CHAIR RAY: Oh, okay. Where?

10 MR. PIERINGER: In the SER.

11 CHAIR RAY: Yes, I know, but where on page
12 16?

13 MR. PIERINGER: It should be close to the
14 bottom.

15 CHAIR RAY: 5.8-2, Evaluation. Staff
16 review of the OSA-2 summary report.

17 MR. PIERINGER: Yes.

18 CHAIR RAY: Okay.

19 MR. PIERINGER: Provides results of OSA-2
20 for the AP1000. Yes, right at the bottom there,
21 second paragraph down.

22 MEMBER SHACK: It's all there. I just
23 didn't get to it.

24 MR. PIERINGER: Okay.

25 MEMBER SHACK: I will say one other thing,

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1 though. Staff who wrote Chapter 18 should instruct
2 the Staff who wrote Chapter 3 on how to use levels.

3 CHAIR RAY: How to use what?

4 MEMBER SHACK: Scanning levels, so that
5 you can make a PDF with bookmarks in it.

6 (Off the record comments.)

7 CHAIR RAY: All right. With that
8 compliment, I guess, is there anything else? We are
9 now at the point, just slightly beyond 11:30, when we
10 were, according to the agenda, to break for lunch, but
11 we have accomplished the first item due to be taken up
12 after lunch. Therefore, at the moment, Eileen, we will
13 wish to proceed with Item 7. Given that it's now past
14 11:30, we'll begin at 12:45, and expand that,
15 hopefully, into as much discussion as is needed for
16 those members here today, that were not present in
17 July, and may have interest in things that are not on
18 your follow-up list. But, also, of course, to go over
19 with you the follow-up items that you have identified.

20 So, we'll commence that discussion at 12:45. Hearing
21 nothing more, we'll end.

22 (Whereupon, the proceedings went off the
23 record at 11:32 a.m., and went back on the record at
24 12:44 p.m.)

25 A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

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(12:44 p.m.)

1
2 CHAIRMAN RAY: Okay. This afternoon we
3 are going to begin with what on the agenda I referred
4 to before is identified here as Summary and Followups
5 from the July 2009 ACRS AP1000 Subcommittee Meeting.

6 We are also, though, going to take
7 advantage of the fact that we are ahead of time
8 schedule to invite queries or requests for later
9 responses on other items not identified during the
10 July meeting but now needed -- needing some further
11 review than we were able to give it then.

12 So those two things will take place during
13 this segment, and then we will wrap up the day with a
14 review of Section 3.4 of the DCDA and the associated
15 SER, as we did this morning.

16 So with that as our agenda, Eileen, I will
17 ask you to tell us how you would like to proceed.

18 MS. MCKENNA: Okay. Thank you. Eileen
19 McKenna again. What we -- as you may recall, after
20 the last meeting we had I'll say maybe about 15 or 20
21 items where the Committee asked for some specific
22 information. In some cases it was provide a
23 particular document, and in a number of cases it was
24 looking for more technical detail on a particular
25 topic.

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1 And what we would like to do today is go
2 through several of those items that Westinghouse is
3 prepared to provide the information at this time, and
4 in other cases they will indicate when they think
5 would be the best time to provide that information,
6 for example, along with the related chapter that you
7 will be seeing at a future meeting, so you will see it
8 in the broader context of the chapter.

9 So if that's --

10 CHAIRMAN RAY: We will not be talking
11 about our COL items.

12 MS. McKENNA: No, since we don't -- this
13 is a DCD meeting, COL items will have to be covered in
14 some other meeting or process.

15 CHAIRMAN RAY: We have our own punch list.
16 Have you -- has that been shared with you?

17 MS. McKENNA: Yes, yes.

18 CHAIRMAN RAY: All right. Fine.

19 MS. McKENNA: I think we are working from
20 the same list.

21 CHAIRMAN RAY: All right, good. That will
22 always --

23 MS. McKENNA: Yes.

24 CHAIRMAN RAY: -- help the conversation.

25 MS. McKENNA: Yes.

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1 CHAIRMAN RAY: All right. Proceed.

2 MS. MCKENNA: All right. In that case,
3 let me turn it, then, to Westinghouse to go through
4 the items that they felt prepared to discuss today,
5 and also the -- what future plans they have.

6 MR. SISK: Thank you, Eileen and Mr.
7 Chairman.

8 Just a couple of comments and preamble, if
9 you will, to going through some of the questions.
10 First and foremost, I think we need to be able to
11 discuss this at a level, at least in this forum, as a
12 non-proprietary. If we do need to go at a level due
13 to the ACRS interest, we may have to either defer or
14 figure out a way to capture the details at a later
15 date or later time. But our intent is really to talk,
16 to the extent practical, in a non-proprietary manner.

17 CHAIRMAN RAY: Understood.

18 MR. SISK: Some of these items as well
19 will fit nicely with future discussions that we will
20 be having with the ACRS. For example, Chapter 15 or
21 even Chapter 7 are two likely places where we will be
22 picking up on some of these items.

23 With that as being the preamble, and
24 perhaps one other caveat, we do have a few experts
25 here to address some of the issues that we are going

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1 to discuss on the list. That is by no means to limit
2 the questions from the ACRS, but recognize we do not
3 have all of our experts here today and would most
4 welcome any questions.

5 If we can't answer them today, we will try
6 to bring them back tomorrow. If we can't do it
7 tomorrow, we will obviously be prepared to follow-on
8 at the next meeting, just as we are doing with this
9 meeting.

10 Thank you.

11 Okay. With that as our starting point,
12 the first question that was identified as a
13 Westinghouse action on the list that we have is ID
14 number 2, the non-condensable gases, and can they
15 affect flow from IRWST. That discussion will
16 primarily be deferred to our Chapter 15 discussion.

17 We are conducting a full safety system
18 review consistent with Generic Letter 2008-01, but I
19 think to go through the details at this time would be
20 a little bit premature, and we would recommend
21 deferring that until we do the Chapter 15 review.

22 CHAIRMAN RAY: Okay. Any comment on that
23 plan?

24 (No response.)

25 Thank you.

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1 MR. SISK: The next item for Westinghouse
2 was the RTD relocation, a question about the impact on
3 dead band and their locations. And for that
4 particular item I would like to turn it over to Mr.
5 Dale Wiseman to discuss a little bit about the RTD
6 location.

7 CHAIRMAN RAY: One minute. I thought for
8 a second there on item 2. Mike, we need to make a
9 note. Said needs to make sure he is aligned with this
10 subsequent discussion, Chapter 15, because he was
11 particularly interested in that subject.

12 MR. LEE: Thank you.

13 CHAIRMAN RAY: Item 3, go ahead.

14 MR. SISK: Mike, briefly I guess we will
15 talk about the RTD location. I'm sorry. No, not
16 Mike. Dale.

17 (Laughter.)

18 MR. WISEMAN: I thought somebody else
19 was --

20 (Laughter.)

21 My name is Dale Wiseman. I'm from
22 Westinghouse.

23 On the RTD relocation question, I think
24 there were a couple of issues here. I think the first
25 one was on the wide-range RTD on the location. There

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1 was some confusion whether a location was -- the wide-
2 range RTDs are used for post-accident monitoring, and
3 they are located in the upper half of the hot legs.
4 And I think at our last meeting there was some
5 confusion as to whether they were -- exactly where
6 they were.

7 CHAIRMAN RAY: Well, there was a reference
8 that said "top" in one place, and then --

9 MR. WISEMAN: That's correct.

10 CHAIRMAN RAY: -- a comment about "upper
11 half," so it led to a discussion about, well, which is
12 it? So at this point, then, the answer is just upper
13 half.

14 MR. WISEMAN: Upper half is what --

15 CHAIRMAN RAY: Okay.

16 MR. WISEMAN: -- is the requirement, yes.

17 There was also some movement of the
18 narrow-range RTDs. At one point, they were downstream
19 of the pressurizer surge line, and they were moved
20 upstream of the pressurizer surge line, because of the
21 impact of the surge that could -- if you have a
22 cooldown and you get the out-surge, it can give you a
23 hotter reading, which would tend to drive your rods in
24 the opposite direction that you want them to go. So
25 those narrow-range RTDs were moved upstream of the

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1 pressurizer surge line.

2 We don't believe there is any impact on
3 the actual location of those RTDs as far as dead band
4 to the control rods. The wide-range RTDs were also
5 located upstream of the passive RHR heat exchanger
6 connection, and that is so when the passive RHR is in
7 operation that measurement is another safety-related
8 measurement in that flow path.

9 So, in general, that is -- that is our --
10 where we are on RTDs.

11 MR. SISK: Are there any additional
12 questions? Did that address the ACRS's concern with
13 regard to RTD relocation?

14 CHAIRMAN RAY: To the best of my
15 recollection, it did. Again, I think the member who
16 raised that particular question is not able to be here
17 today, so --

18 MR. SISK: Okay.

19 CHAIRMAN RAY: That's fine. You've given
20 an answer on the record, and that will suffice. Thank
21 you.

22 MR. SISK: The next item was the reactor
23 coolant pump flywheel design, and there was a question
24 regarding what the inertias were. And I do think we
25 talked a little bit about that the last time around.

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1 But as for the record, again, I will defer to Dale,
2 and we will go to the next one.

3 MR. WISEMAN: Yes. In the -- there was a
4 change in the reactor coolant pump inertia. In Rev 15
5 of the DCD, the inertia was 16,500 pound-foot squared,
6 and that inertia was increased in Rev 17 up to 23,500
7 pound-foot squared.

8 There is really no impact to the safety
9 analysis here, because the safety analysis coastdown
10 curve did not change between Chapter 15 and Chapter 7
11 -- or Rev 15 and Rev 17. What changed is, as the pump
12 design progressed, the calculation of the friction and
13 the losses was more detailed. And so the increase in
14 inertia is essentially maintaining the same margin
15 that we had before that -- just based on the bigger
16 motor and the better calculation of the losses.

17 MEMBER BLEY: Which apparently you
18 wouldn't have had if you stayed with the old one.

19 MR. WISEMAN: Well, that's correct.
20 That's correct.

21 MEMBER BLEY: So it really does change.

22 (Laughter.)

23 Go ahead.

24 MR. WISEMAN: But the safety -- what's
25 used in the safety analysis, the coastdown curve --

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1 MEMBER BLEY: You made it good.

2 MR. WISEMAN: -- is the same. Right.

3 MR. SISK: Okay. And I think there was a
4 question as well regarding the flywheel missile
5 analysis. A flywheel structural evaluation report was
6 submitted to the NRC July 2009, but basically we don't
7 think there is any significant missile impact from the
8 RCP flywheel.

9 MR. WISEMAN: Yes. That missile analysis
10 took into account the revised flywheel design to get
11 higher inertia, and the conclusion in that report was
12 the same as previous in that the pressure boundary
13 would contain -- contain any flywheel missile. If the
14 flywheel would happen to have -- have a break in the
15 flywheel, it would all be contained within the
16 pressure boundary.

17 CHAIRMAN RAY: Yes. I remember pursuing
18 that query somewhat, and I can't recall the details,
19 other than the origin of the concern right now. Let
20 me ask Eileen -- what is the status of that review,
21 Eileen, do you know?

22 MS. McKENNA: Well, as was indicated, the
23 report came in relatively recently. So I don't think
24 we have finished a review of that, just timing-wise of
25 where we are with looking at these different chapters.

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1 CHAIRMAN RAY: All right. We'll have -- I
2 would just like to make note that we'd like to at some
3 future time be updated, when the staff is prepared, on
4 the results of that, please.

5 MS. McKENNA: Of course.

6 CHAIRMAN RAY: Because it is an
7 interesting challenge to have significant missile
8 potential within the reactor coolant pressure
9 boundary. And how that is dealt with is of interest.

10 Yes, Tom.

11 DR. KRESS: Did you have to change the
12 design of the pump exterior to -- because that's a
13 significant increase in kinetic energy, and --

14 MR. WISEMAN: The length of the pump
15 increased slightly, because the -- we made the lower
16 flywheel a little bit longer, but we are talking about
17 an inch or two.

18 DR. KRESS: When you make a missile
19 analysis for a circular flywheel, do you assume part
20 of it comes apart and -- or half of it, or how do
21 you --

22 MR. WISEMAN: The assumption was that
23 there are -- the flywheel is made up of segments.

24 DR. KRESS: Segments, okay. So one
25 segment may come apart.

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1 MR. WISEMAN: Well, the assumption was
2 they all --

3 DR. KRESS: They all come --

4 MR. WISEMAN: They all come apart.

5 DR. KRESS: Yes, but that was -- it would
6 be the same as assuming one comes apart.

7 (Laughter.)

8 MR. WISEMAN: It's very -- yes.

9 DR. KRESS: Yes.

10 (Laughter.)

11 MR. WISEMAN: Because the one segment is
12 going to impact in one area. The second segment is
13 going to impact around.

14 DR. KRESS: Do you use the standard
15 kinetic energy relationship to see whether it will
16 penetrate or not?

17 MR. WISEMAN: I believe so, but I have to
18 check and make sure in the report.

19 CHAIRMAN RAY: Well, that would be
20 something we are interested in looking at at the
21 appropriate time. That's all we need to note here,
22 because it's an interesting problem.

23 MR. SISK: Okay. The next item that we
24 had on the list was a discussion on the pressurizer
25 due to the shape change that was identified, did it

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1 have an effect -- what was described as a chugging
2 effect with ADS discharge.

3 This is another item that will be
4 ultimately discussed in the Chapter 15 review in
5 November. And without going into --

6 MEMBER BANERJEE: Which dates are those
7 reviews?

8 MR. SISK: I'm sorry?

9 MEMBER BANERJEE: What's the dates for the
10 reviews?

11 MR. SISK: November 16th and 17th?

12 MS. McKENNA: I think it's 19th and 20th,
13 isn't it, Mike?

14 MR. LEE: I don't -- I can -- next break I
15 can --

16 CHAIRMAN RAY: 19th and 20th.

17 MS. McKENNA: Yes.

18 MR. SISK: Okay.

19 MEMBER BANERJEE: Can you go ahead and
20 discuss the chugging effect on the ADS discharge?

21 MR. SISK: I know that the impact is --
22 again, recognizing that we are in an open forum, we
23 will discuss that as a part of the Chapter 15
24 analysis.

25 CHAIRMAN RAY: Should we plan a

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1 proprietary review?

2 MS. McKENNA: Well, this is something we
3 hadn't --

4 MEMBER BANERJEE: Maybe. I don't know. I
5 have to look into it.

6 CHAIRMAN RAY: Okay.

7 MS. McKENNA: I think in November we will
8 need to have some time, some part, some of the
9 sessions be proprietary for other reasons. So we may
10 want to take -- I will be discussing that with the
11 staff.

12 CHAIRMAN RAY: Let's just assume that --

13 MR. LEE: We can do that. We can do
14 whatever is necessary. But I just want to -- a
15 followup item at the break. I want to get back and
16 look at our schedule, because there has been some
17 shuffling of --

18 MS. McKENNA: Oh, okay.

19 MR. LEE: -- chapters over the last couple
20 weeks, and I want to make sure that the record -- you
21 know, if it's November, it's November. Whatever. But
22 I just --

23 MS. McKENNA: Yes.

24 MEMBER BANERJEE: So in this effect,
25 though, are you going to look at the implications that

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1 it might have on the best estimate LOCA analysis? Or
2 are you referring to the isolation --

3 MR. SISK: You're referring to the
4 redesign of the pressurizer and what its impact is on
5 Chapter 15?

6 MEMBER BANERJEE: Yes.

7 MR. SISK: Ed, do you want to --

8 MR. CUMMINS: Yes. This is Ed Cummins.
9 Listening to the staff, basically they had an
10 extensive RAI on what is the impact of the pressurizer
11 change on the safety analysis. And we submitted a big
12 report that went through each of the safety analyses
13 and gave an assessment of the impact on -- and,
14 generally, the assessment was minor change or positive
15 change or no change. And so -- and there were no
16 curves of -- typical curves you would find in
17 Chapter 15 as part of that.

18 So the analyses were run again. Actually,
19 they were run again for both the pressurizer change
20 and the flowskirt change, and another panel analysis
21 for the flowskirt as well.

22 MEMBER BANERJEE: So for the flowskirt,
23 did you actually have measurements that you used, or
24 -- sorry, can you hear me on the --

25 PARTICIPANT: No, we couldn't hear you.

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1 CHAIRMAN RAY: He indicated -- he said he
2 could not hear you. Ask your question again, please.

3 MEMBER BANERJEE: For the flowskirt
4 change, did you use measurements that you had made on
5 a scaled model, or --

6 MR. CUMMINS: No. I think it's just the
7 code predicting the phenomenon of going through the --
8 back and forth through the flowskirt. So it was not
9 -- we have done some model testing, but that's
10 completely independent of the safety analysis.

11 MEMBER BANERJEE: So this you put some
12 loss factor or something on --

13 MR. CUMMINS: Yes.

14 MEMBER BANERJEE: -- with that.

15 MR. CUMMINS: Yes.

16 MEMBER BANERJEE: Okay. And it looked
17 like a reasonable -- you did a sensitivity study or
18 something?

19 MR. CUMMINS: Yes. There was some special
20 effects thought process about flow in both directions
21 through the flowskirt, depending on where your break
22 is, what might occur. And there was a little bit of
23 confirmation, a scale model test, of some of that, but
24 just in a generic way.

25 MEMBER BANERJEE: You also changed the

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1 methodology to best estimate plus uncertainty for
2 LOCA, right?

3 MR. CUMMINS: Yes, we did. That's for
4 large break LOCA.

5 MEMBER BANERJEE: Only for large break.

6 MR. CUMMINS: Yes.

7 MEMBER BANERJEE: Okay. And how did you
8 factor in the pressurizer effects on ADS discharge
9 potentially, if there was any?

10 CHAIRMAN RAY: Sanjoy, I think you're
11 trailing off the recording.

12 MEMBER BANERJEE: Sorry. It's so hard to
13 -- I thought these mics were improved.

14 (Laughter.)

15 MR. CUMMINS: I don't know. I mean, I
16 think that we just ran the model and had it predict
17 what the results were. But I'm -- I think we should
18 cover the details of this when we cover Chapter 15.

19 MEMBER BANERJEE: Yes.

20 MR. CUMMINS: Right.

21 MEMBER BANERJEE: So this will be covered
22 under Chapter --

23 MR. CUMMINS: Yes.

24 MEMBER BANERJEE: And you have submitted
25 these reports.

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1 MR. CUMMINS: We have submitted the
2 results to the staff.

3 MEMBER BANERJEE: And you brought also the
4 methodology. Now, did we approve ASTRUM for AP1000 or
5 not?

6 MR. CUMMINS: We are asking for it to be
7 approved as part of this Rev 16 and 17.

8 MEMBER BANERJEE: As part of it.

9 MR. CUMMINS: Yes.

10 MEMBER BANERJEE: And --

11 MR. CUMMINS: You hadn't previously -- you
12 had not previously --

13 MEMBER BANERJEE: We had not.

14 MR. CUMMINS: -- had not previously
15 approved it.

16 MEMBER BANERJEE: But what is the best
17 estimate quote that you are using for large-break
18 LOCA?

19 MR. CUMMINS: COBRA/TRAC.

20 MEMBER BANERJEE: And did we approve that
21 for --

22 MR. CUMMINS: Yes, you did.

23 MEMBER BANERJEE: Okay. Okay. So it's
24 just ASTRUM.

25 MR. CUMMINS: And that's a probabilistic

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1 look at COBRA/TRAC results, yes.

2 CHAIRMAN RAY: All right. So we -- and
3 lastly, Sanjoy, do you wish to see any of that
4 material before our November meeting, assuming it's on
5 for November as Westinghouse thinks?

6 MEMBER BANERJEE: Yes.

7 CHAIRMAN RAY: Okay.

8 MEMBER BANERJEE: We need to see it. Of
9 course, I'm hoping that Weidong will help me to find
10 the pieces that I should look at in more detail.

11 MS. MCKENNA: This probably goes back to
12 your initial comment about in this case there is --
13 you know, there was a specific report on ASTRUM, as
14 mentioned there were specific RAI responses on the
15 pressurizer change and the effects on the safety
16 analysis, which it sounds like might be of interest.

17 And then, ultimately, the staff will be
18 providing its safety evaluation report that will blend
19 all of that information together to present the
20 results of its review and the changes that -- which
21 have been put forward, which include, obviously, the
22 ASTRUM, the pressurizer, flowskirt, among others.

23 MEMBER BANERJEE: Is the power in the
24 plant primarily LOCA limited?

25 MR. SISK: Is the power LOCA limited?

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1 MEMBER BANERJEE: Yes. Or DNB. It's
2 LOCA, isn't it?

3 MR. SISK: Let me defer.

4 MR. CUMMINS: Yes. This is Ed Cummins
5 again. You were near the LOCA limits on the AP1000
6 design cert, and the ASTRUM -- use of ASTRUM puts us
7 well below the LOCA limits.

8 MEMBER BANERJEE: Right.

9 MR. CUMMINS: So we didn't really look at
10 power effects, and we are already -- we are quite
11 happy with where our power is at the moment.

12 MEMBER BANERJEE: And the DNB limits are
13 part --

14 MR. CUMMINS: The DNB limits have
15 requirements to have at least 15 percent margin -- is
16 the URD requirement that we still -- we met that
17 before. We continue to meet that.

18 MEMBER BANERJEE: Nothing has changed
19 there.

20 MR. CUMMINS: No.

21 MEMBER BANERJEE: Well, we will need to
22 look at this in some detail, because of course you get
23 a lot of margin with ASTRUM.

24 MR. SISK: Well, recognize we -- we also
25 had to submit a LIN, and we're looking for the staff

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1 conclusions on that, looking forward to that.

2 CHAIRMAN RAY: Well, let me just make this
3 observation, then. Without wanting to impose any
4 requirements that don't already exist on the staff, or
5 what not, it could facilitate our meeting in November
6 if Dr. Banerjee had a chance to look at anything that
7 is available that is relevant to this discussion ahead
8 of time.

9 MS. McKENNA: Yes.

10 CHAIRMAN RAY: No promises, but if that's
11 possible and can be done, it might make things go --

12 MEMBER BANERJEE: Well, yes. It would
13 help if it was sufficiently in advance that we could
14 take a close look at it as well, because it's going to
15 be a lot of --

16 MS. McKENNA: Well, those documents are
17 available in the record, so we should be able to get
18 them to you very shortly.

19 MEMBER BANERJEE: Thank you.

20 MS. McKENNA: Yes.

21 CHAIRMAN RAY: All right. Let's see,
22 anything else on -- were we on 6 or 5? I believe we
23 were on 5.

24 MS. McKENNA: We were on 5.

25 CHAIRMAN RAY: Yes. Okay. Anything now

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1 on 5, then?

2 (No response.)

3 Proceed.

4 MR. SISK: Okay. Item 6 was the
5 flowskirt. Actually, you will see a picture of that
6 tomorrow in Chapter 3, the discussion. But there were
7 a couple of specific questions that the Committee had
8 regarding flowskirt, and for those I want to turn it
9 over to, again, Mr. Dale Wiseman.

10 MR. WISEMAN: I think the question from
11 July was what our min to average and peak to average
12 results were. Basically, we did our initial analysis,
13 our initial CFD analysis. Our min to average was in
14 the range of about half to 75 percent -- and this
15 occurred, the min occurred, in the periphery. Our
16 peak to average was in the -- between 1 and 115, so --
17 1.15.

18 It was the min that caused us concern,
19 because of the large crossflows that this can impart
20 in the peripheral assemblies. So we modeled the
21 flowskirt, we modeled a lot of different changes, but
22 the flowskirt, we were able to increase that -- those
23 numbers in the periphery into the range that our fuels
24 people wanted to see, and the peak to average didn't
25 really change very much.

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1 And so that was consistent results, and
2 the peripheral assemblies were still lower, but much
3 closer to the average. And so that was the basis for
4 introducing the flowskirt into the design.

5 MEMBER BANERJEE: So what did that ratio
6 become? Or can you speak with that --

7 MR. SISK: To get into specific numbers,
8 we would like to have a proprietary discussion for
9 specific details.

10 MEMBER BANERJEE: Yes, okay. But this was
11 on the basis of the CFD calculations. What quote did
12 you use?

13 MR. WISEMAN: These calculations were done
14 with CFX.

15 MEMBER BANERJEE: CFX, okay. So this was
16 a little bit -- a few years ago.

17 MR. WISEMAN: Yes.

18 MEMBER BANERJEE: All right.

19 MR. WISEMAN: Yes.

20 MEMBER BANERJEE: And was there any
21 validation of this? I seem to remember there was a
22 scale model or something.

23 MR. WISEMAN: Right. To validate, to
24 confirm this design, we initiated a one-seventh scale
25 test program. That program is still ongoing. We

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1 don't have final results at this time. But the -- our
2 initial results, our initial preliminary results I
3 should say, are -- they show the same trends.

4 The overall trend is consistent with the
5 CFX analysis, in that the peripheral assemblies are on
6 the low side, lower. The higher flows are in the
7 center. So we are still in the process of validating
8 that. We are also in the process of doing additional
9 CFD analysis with a more detailed model to use in the
10 verification process.

11 But the initial test results would show
12 that the trends predicted by the CFD are confirmed by
13 the -- at least by the initial test results.

14 MEMBER BANERJEE: This is a fretting
15 concern for the fuel.

16 MR. WISEMAN: Yes. Yes.

17 MEMBER BANERJEE: Okay. And the fuel is,
18 you know, CFD calculation being modeled as a porous
19 media, or you are actually modeling the sub-channels?

20 MR. WISEMAN: In the CFD, the -- it's
21 really the core support plate that is sitting -- the
22 core support -- lower core support plate. In the
23 test, we had individual venturis at each fuel assembly
24 location. So we are measuring at each fuel assembly
25 location.

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1 MEMBER BANERJEE: So the flow resistance
2 of the fuel itself is mocked in in some way by the
3 venturis or by some --

4 MR. WISEMAN: No, not --

5 MEMBER BANERJEE: -- particular --

6 MR. WISEMAN: Yes. Not the whole delta P
7 of the core, but a substantial part. And maybe Greg
8 Meyer can --

9 MR. MEYER: Yes. My name is Greg Meyer
10 with Westinghouse. I have been working with Dale on
11 the one-seventh scale model in the CFD.

12 To answer your question, it is kind of a
13 combination between using preliminary test results,
14 say from calibration results, getting resistances for
15 venturis. We are modeling the localized resistance
16 right above the lower core support plate, but still
17 along redistribution from the legs of the fuel.

18 So in the CFD, there is a one-seventh
19 scale CFD. There will be a full-scale also, a revised
20 model. But they will also allow -- it's above the
21 lower core plate with legs, with using resistances, at
22 least for the one-seventh scale CFD model, that were
23 in the model itself as measured, or something close to
24 that as measured.

25 So it is in individualized columns, if you

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1 will, that actually model venturis themselves, a lot
2 of the redistribution.

3 MEMBER BANERJEE: So let me get this
4 clear. The CFD is actually putting in loss factors
5 which are sort of the loss factors you are finding in
6 the experiments, is that it?

7 MR. MEYER: In terms of modeling the model
8 at one-seventh scale, so we can actually understand
9 the model scale in CFD space also, that's correct.

10 MEMBER BANERJEE: Okay. So now when you
11 go to trying to look at a full-scale system, how is
12 the resistance in the fuel being mocked up? Is there
13 some sort of loss factor associated with things above
14 the core support plate, or how are you doing that
15 modeling?

16 MR. MEYER: Yes. The initial models that
17 Dale spoke of, it was modeled as just a general porous
18 media --

19 MEMBER BANERJEE: Okay.

20 MR. MEYER: -- with a general resistance
21 applied to that. The newer models being constructed,
22 the higher fidelity, will have more specific
23 information from test data.

24 MEMBER BANERJEE: But these loss factors
25 are obviously not isotropic, right? They have to be

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1 anisotropic. So the crossflow loss will be different
2 from --

3 MR. MEYER: That's very important,
4 actually. They have to allow the variation in the
5 one-seventh scale from venturi to venturi, and what
6 you may have in the actual fuel assembly also.

7 MEMBER BANERJEE: So is this matter now
8 put to bed, the matter of the flowskirt and -- or is
9 there a report coming out that we can look at?
10 Because I guess what you are really saying is that you
11 are going to have, with this flowskirt, enough flow at
12 the periphery of the core not to have a fretting
13 problem.

14 MR. MEYER: That's the intention.

15 MEMBER BANERJEE: That's the intention. I
16 imagine that you want to be sure that that's true --

17 MR. MEYER: Correct.

18 MEMBER BANERJEE: -- for your customers,
19 too. But are you sort of submitting this material to
20 the NRC, or do you consider this the results? I mean,
21 are you sending the details of the calculations in for
22 review?

23 MR. CUMMINS: This is Ed Cummins. I don't
24 think we intended to, because it wasn't part of the
25 scope of the review, really. This is kind of what we

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1 would call equipment engineering design or final
2 equipment design. And I would say that it -- the
3 flowskirt that you are asking -- the flowskirt is
4 definitely part of the design.

5 Could we alter the whole pattern or do
6 something in it? I believe the answer still is yes.
7 Depending on the test results and the analysis
8 results, we could make small alterations to it to
9 achieve more uniform flow.

10 DR. KRESS: Sanjoy, we've been neglecting
11 the friction losses to the core, from the standpoint
12 of redistribution of the flow. The more loss you have
13 the more apt you are to get a uniform flow through the
14 whole thing I think.

15 MEMBER BANERJEE: Right. So it depends on
16 -- they are not neglecting the losses. They are
17 putting it as --

18 DR. KRESS: They're putting in a
19 coefficient.

20 MEMBER BANERJEE: They are putting --

21 DR. KRESS: Well, my point was that may be
22 worse than just neglecting them.

23 MEMBER BANERJEE: Well, if I understand
24 what they are doing, they are putting in the
25 anisotropic porous media, so you get crossflow.

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1 DR. KRESS: Yes. But, you know, that
2 sometimes -- you know, depending on your flow rates
3 and those numbers, that sometimes doesn't make a good
4 model of flow to the core. I would have neglected it
5 and said I was conservative, but --

6 MEMBER BANERJEE: Neglected would
7 certainly be conservative, but probably they don't
8 want to do that. They want to get a realistic.

9 DR. KRESS: May not get the right answer,
10 okay.

11 MR. MEYER: You could completely -- yes,
12 you could come up with unrealistic -- a completely
13 unrealistic number that is not of design value or
14 input value.

15 DR. KRESS: Yes, that's true. They don't
16 really know what you have.

17 MEMBER BANERJEE: I guess the issue is --
18 my concern here is not to do with the normal
19 operation, because they have to figure that out. And
20 if they don't, the customers will go for them. It's
21 more an issue of what it does in certain, you know,
22 transient calculations, and how you might model that.

23 So that is probably the issue that I am concerned
24 about.

25 But I think it can be handled -- the

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1 appropriate loss factors and things, but just how you
2 are doing -- what loss factors you are using and how
3 you are supporting that is really the issue.

4 MR. CUMMINS: So I believe that our view
5 of what you are -- we have the view that your concern
6 would be your concern.

7 MEMBER BANERJEE: Yes.

8 MR. CUMMINS: And we have done analysis to
9 show the impact on the flowskirt, all of the safety
10 analysis. So the details of whether we get the exact
11 right flow to each of the fuel elements is sort of our
12 problem. But the safety analysis is sort of the NRC's
13 -- in the NRC's purview for being reviewed and
14 assessed.

15 MEMBER BANERJEE: So we'll take a look at
16 it and see. I guess the supporting information that
17 -- if I was doing the calculation, I would probably
18 take the CFD results and the validation and put in the
19 resistances and stuff like that based on that. That's
20 probably what you've done in the safety analysis. And
21 then, you have done some sensitivity study. Is that
22 roughly the correct view?

23 MR. CUMMINS: I don't know exactly. I
24 don't think so. I think that we have been -- we
25 haven't used the CFX for the safety analysis. We have

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1 used our safety analysis codes, and we have modeled it
2 with nodes into our safety analysis codes. So --

3 MEMBER BANERJEE: So how did you then
4 model the loss factors associated with the skirt?
5 Because I guess the skirt is redistributing things so
6 -- redistributing the pressure losses and things.

7 MR. CUMMINS: Yes. There is certainly a
8 pressure drop across the skirt.

9 MEMBER BANERJEE: Right. So you have
10 simply taken a sort of measured loss factor and put it
11 in there or how -- that's what I'm asking. How did
12 you do that? Did it come out of the CFD calculations?
13 Did it come out of the measurements? Or was it some
14 amalgamation of the two?

15 MR. CUMMINS: I believe it was calculated
16 by COBRA/TRAC, but I'm not positive.

17 MEMBER BANERJEE: How can COBRA/TRAC
18 calculate the loss factor for a skirt?

19 MR. WISEMAN: This is Dale Wiseman. I
20 believe what went into this safety analysis is -- was
21 our best estimate of resistances based on our
22 historical values for the downcomer in the lower
23 plenum, plus our best calculation that we could make
24 on the flowskirt losses.

25 And so that -- the overall delta P between

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1 the inlet and the inlet to the core was determined
2 with our best estimate. And we had what we believed
3 to be a conservative value that we put in there,
4 conservatively -- we had a range to look at.

5 And the -- actually, the preliminary
6 pressure drop data from our test shows that our
7 calculated pressure drops on a normal flow basis are
8 right in the range that we predicted them to be. So
9 the initial test results are confirming that the range
10 of pressure drops that are looked at in the safety
11 analysis is probably a valid number.

12 MEMBER BANERJEE: So this flowskirt must
13 add some flow resistance, because you are
14 redistributing the flow.

15 MR. WISEMAN: Yes.

16 MEMBER BANERJEE: So it's a higher
17 pressure loss going both ways. I mean --

18 MR. WISEMAN: Yes, during an accident.
19 Right.

20 MEMBER BANERJEE: During an accident.

21 MR. WISEMAN: It was during an accident,
22 so --

23 MEMBER BANERJEE: So it's not obvious what
24 is conservative, what is not conservative. There is
25 all sorts of issues, right? Because it acts as a

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1 resistance to the blowdown if it's reversing the flow.

2 MR. WISEMAN: Right.

3 MEMBER BANERJEE: So the main issue here
4 is really, if the results are not very sensitive to
5 the flow resistance, then it is not a big deal. But
6 it would be interesting to see how sensitive the
7 results are, and you have done some sensitivity
8 analysis or not on this, to see, you know, if you
9 change it by a factor of two, what happens.

10 MR. WISEMAN: I am not sure exactly what
11 happens. It all has been run in the safety analysis
12 case, so I think we'd had to check on that.

13 MEMBER BANERJEE: But you have submitted a
14 safety analysis case, which --

15 MR. WISEMAN: Yes.

16 MEMBER BANERJEE: -- we can look at.

17 MR. WISEMAN: Yes.

18 MEMBER BANERJEE: And I guess that's what
19 we should do, and try -- the impact of the flowskirt
20 that we are interested in, of course, is only various
21 accident scenarios. So we have to take a look at that
22 and see.

23 MR. LEE: Is the Committee asking for I
24 think another little breakout session on this
25 particular issue, not unlike what we -- was asked for

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1 with the pressurizer, item 5?

2 MEMBER BANERJEE: Well, it could be that
3 the two things could be put together. I mean, you are
4 probably going to need to look in some detail at
5 several issues related to this. There is a change in
6 methodology, there is a change in flowskirt, there is
7 a change in pressurizer. I'm not quite sure how we
8 will organize this, but we talked to Harold, and then,
9 you know, see what was the best way to --

10 MR. LEE: For Eileen's benefit or --

11 MEMBER BANERJEE: Right, yes.

12 MR. SISK: I would point out one item as
13 just an aside, not to move -- like I say, we can go
14 into more details at the appropriate time. But I
15 would point out as well that the flowskirt is not
16 modeled, it is being used in the operating fleet. So,
17 I mean, there is some additional information out
18 there, and obviously some experience with flowskirts
19 as a whole that plays into all of this.

20 MEMBER BANERJEE: Is it very similar to
21 what you are using in the operating fleet?

22 MR. SISK: From the context of the
23 flowskirt, yes.

24 MEMBER BANERJEE: Yes.

25 CHAIRMAN RAY: Yes. I think that at this

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1 point what we should do -- and I'm going to look to
2 Eileen, as I did before -- is define what exists that
3 would be helpful to a review that can be readily
4 assimilated in advance of we'll call it the November
5 meeting, for the sake of making an assumption here.

6 And the purpose of that is only to
7 facilitate discussion at that time, not to answer
8 questions that might properly be posed. If there is a
9 set of documents, technical reports, that can be
10 provided in advance of that meeting, that may well be
11 helpful. Otherwise, we need to probe this quite
12 thoroughly, and probably as part of the proprietary
13 section of that meeting. Is that satisfactory?

14 MEMBER BANERJEE: Yes. I think if we got
15 the documentation, so we could also have it reviewed
16 by our consultants -- probably Graham Wallis, because
17 I'm not going to have the time to do it between --

18 CHAIRMAN RAY: Sooner rather than later.

19 And so, Mike, from your standpoint, Sanjoy
20 has indicated that we need expertise in this area to
21 conduct a review of the material.

22 MR. LEE: We'll tickle the keys.

23 CHAIRMAN RAY: Let's not get into that,
24 just take it as needing to be done.

25 MR. LEE: Yes, right.

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1 CHAIRMAN RAY: Okay. We can only do what
2 we can do, but we can try and do what needs to be
3 done. Okay.

4 MEMBER BANERJEE: So we can move on.

5 CHAIRMAN RAY: Yes. Well, I want to make
6 sure you've got all you need at this point.

7 Okay. We are still on item 6 until you
8 move us on. There is an item over here that says,
9 Eileen, "DNRL to provide background documents from
10 AP1000 review that may help ACRS better understand the
11 issue." I'm not sure if that was --

12 MS. McKENNA: It's probably a -- probably
13 the topic, the whole -- it is probably the whole
14 subject of like just the things we were talking about.

15 So --

16 CHAIRMAN RAY: Okay. So to some extent
17 that was recognized earlier I guess --

18 MS. McKENNA: Yes. Yes.

19 CHAIRMAN RAY: -- and we need to actually
20 do it.

21 MS. McKENNA: Right.

22 CHAIRMAN RAY: As Sanjoy has indicated,
23 that particular individual he thinks would help us,
24 and we'd better get that going, then.

25 Okay. Let's move ahead.

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1 MR. SISK: Okay. Moving to item 7, which
2 is the zinc injection. There were some discussions
3 last time with regarding to the operating experiences
4 of zinc injection, its application to 14-foot cores,
5 and a question on exothermic reaction.

6 And for that, I am going to turn it over
7 to Mr. Don Lindgren, and he will walk us through with
8 where we are with zinc injection.

9 MR. LINDGREN: I'm Don Lindgren,
10 Westinghouse, AP1000 licensing lead on zinc.

11 I have been dealing with zinc since before
12 I was working on AP1000, so we have had zinc injection
13 in operating plants. So our use of it is based on
14 that.

15 The first question was: is there an
16 exothermic reaction? The answer is: no, the zinc is
17 injected into the system in the form of zinc acetate.

18 So it's not metallic zinc. There is also -- it is
19 also a very small amount. It is -- you maintain it at
20 a rate no higher than 40 parts per billion, so there
21 is not much zinc floating through the system.

22 The estimate is if you -- it was all
23 metallic and it was -- had all the zinc and reacted it
24 with boric acid, you would get about a cubic foot of
25 hydrogen. So there is not a lot of zinc from that

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1 item.

2 How much zinc coats on the fuel -- once
3 again, from our experience in the operating fleet, it
4 is a very small -- a very thin layer, on the order of
5 a micron. So it's enough to turn the fuel black, but
6 not much more than that.

7 DR. KRESS: The concern was whether it had
8 any effect on DNB, the coating.

9 MR. LINDGREN: You end up probably with a
10 thinner layer than you have of the -- the whole
11 purpose for putting zinc into the system is to reduce
12 the corrosion of all of the stainless steel and nickel
13 alloy surfaces. So --

14 DR. KRESS: I don't know which way that
15 takes the --

16 MR. LINDGREN: I think if you are -- any
17 time you are reducing a layer of material, you are --
18 you release less primarily nickel and cobalt into the
19 system. So they are not available to plate out onto
20 the fuel.

21 DR. KRESS: Yes, I understand that.

22 MR. LINDGREN: Okay. So in an operating
23 plant where -- when you are introducing zinc, you have
24 to be careful about how you do that, because it will
25 tend to shift the corrosion product that is on the

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1 surface of the fuel and will -- and because some of it
2 is cobalt, it will -- you have to worry about that
3 effect.

4 In a plant where you are starting it from
5 the beginning, there is -- and you are reducing the
6 zinc and nickel release from the --

7 DR. KRESS: I was concerned about a -- you
8 know, I knew that it turns the fuel kind of blackish-
9 looking, but I was concerned how that might affect
10 your LOCA analysis, whether or not it approaches the
11 departure of -- I don't know that it does or doesn't.

12 It just seems to me like it could have some effect.
13 What do you think, Sanjoy?

14 MEMBER BANERJEE: I don't know. I mean,
15 it has been done for a long time, so --

16 (Laughter.)

17 We have sort of said it's fine.

18 MR. SISK: I think, generally speaking,
19 the addition of zinc has been demonstrated to be a
20 general benefit overall in the reduction of corrosion
21 and crud build-up on the fuel. And as such, as --

22 DR. KRESS: It has beneficial effects.

23 MR. SISK: Exactly. It has been
24 beneficial, which is why more and more have looked at
25 going in that direction. The real benefits -- and one

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1 of the things that we look at on the AP1000 side of
2 course -- is by putting it in from day one. A lot of
3 plants look at it after the fact, but have found it to
4 have positive impacts after the fact. So --

5 MEMBER BANERJEE: It's a very complicated
6 thing that occurs. I mean, eventually you get lower
7 radiation fields, of course. That is what you are
8 really interested in. But the exact transport
9 deposition and activation and moving out, it's a
10 complex process, but it certainly does deposit on the
11 fuel. And it certainly does get, you know, some
12 effect. Now, what effect that is, I don't know that
13 anybody has ever tested it.

14 MR. LINDGREN: Much of what you were
15 talking about, the complex part of it is -- is when
16 you have an existing plant with existing fuel that
17 adds an existing corrosion layer on it. And you do
18 tend to, as part of the process, release some of that
19 into the fuel and have it shift around.

20 As we said, the advantage of starting off
21 with it, you know, from day one is you don't have to
22 worry about that shifting around of the corrosion.
23 You get primarily the benefit -- just the benefit of
24 reducing the corrosion layer everywhere in the plant,
25 and releasing less of the cobalt and the nickel into

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1 the fluid from day one.

2 DR. KRESS: That is certainly a good
3 thing.

4 MR. LINDGREN: Yes. And going back to the
5 fuel and DNB and that -- I mean, we still do end up
6 with a corrosion layer. It's small. It's thinner
7 than before, but it's not -- it's not clean metal. So
8 I would expect that you still have that effect.

9 MEMBER BANERJEE: I think we will hear
10 something about this later, because we did a study on
11 Leipstadt for exactly this. Looked at -- we looked at
12 the cobalt, where it went, and the zinc. And it's a
13 very complicated business, but anyway, as he says,
14 probably putting it early is better than putting it
15 late, so --

16 MEMBER BLEY: When you do this early, does
17 that change the way you precondition things and --

18 MR. LINDGREN: Well, yes. In fact, when
19 you introduce it, I mean, the 40 parts per billion is
20 a maximum level. When you introduce it into an
21 operating plant that already has fuel that has been
22 exposed, you tend to start it like five or 10 parts
23 per billion, because you don't want to get what --

24 PARTICIPANT: Burst.

25 MR. LINDGREN: Well, no, not so much the

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1 burst, but the -- let me get the right term -- crud-
2 induced power shift, also known as the axial offset
3 anomaly. So, you know, if you blast it with -- 40
4 parts per billion is not a lot, but if you start out
5 with 40 parts per billion, you can get the crud that's
6 on the fuel to move around. And that's something you
7 don't want to do, because I'm not sure exactly what
8 happens to the power levels in the rock. So --

9 DR. KRESS: I assume you keep the level,
10 some level, during the full --

11 MR. LINDGREN: Yes, this is --

12 DR. KRESS: -- 60 years of operation?
13 That was another concern, because if it's not played
14 out, it it's continually building up over -- I guess
15 what -- your cycle for fuel is like two years?

16 MR. SISK: Eighteen months. But, yes, and
17 remember we are replacing fuel on a regular basis.

18 DR. KRESS: I guess that would be --

19 MR. LINDGREN: Well, yes, that would be --

20 CHAIRMAN RAY: I'm glad I took advantage
21 of the time we built up this morning, as we are using
22 it now, to good effect I trust. But I will note we
23 have 24 of these items, and then some further
24 discussion, so maybe we should move on.

25 MR. SISK: Well, hopefully we don't have

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1 24 more to go, but --

2 CHAIRMAN RAY: By the way, is this the
3 presentation?

4 MR. SISK: We have 21.

5 CHAIRMAN RAY: I know. Is this the
6 presentation at a future meeting that we were
7 referring to here in the comments on this item 7?

8 MR. SISK: I think it was what we were --

9 CHAIRMAN RAY: In other words --

10 MR. SISK: -- discussion, yes. The answer
11 is yes.

12 CHAIRMAN RAY: Okay.

13 MR. LINDGREN: There was a -- one final
14 note is that we did provide the staff with the
15 technical report on the zinc addition. It dates from
16 April of '06, so it was one of the very first ones we
17 sent in. And there is that available if --

18 CHAIRMAN RAY: All right. So, in any
19 case, the ball is in our court to raise the flag on --

20 MS. McKENNA: Correct, yes.

21 CHAIRMAN RAY: Okay.

22 MR. SISK: And I will add one other
23 statement that we didn't make but did come up in July.

24 This has been applied to 14-foot cores as well. Zinc
25 has been applied to 14-foot cores, which was one of

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1 the questions that I believe came up about the core,
2 did that have an impact, and the answer is no.

3 CHAIRMAN RAY: All right. Onward.

4 MR. SISK: Onward. The next item that
5 Westinghouse had as an action was the turbine
6 overspeed protection. During the Chapter 10, we had
7 some question about looking at the diversity of
8 turbine speed -- excuse me, turbine overspeed
9 protection. Again, I will defer to Mr. Don Lindgren,
10 and I will put a figure up here on the screen.

11 CHAIRMAN RAY: Okay.

12 MR. LINDGREN: This is -- once again, this
13 is Don Lindgren. We have very recently turned in an
14 RAI response revision that addresses this issue -- and
15 this figure in the RAI, which -- it is worth more than
16 1,000 words, I believe -- these are the two overspeed
17 protection systems.

18 The top one, there is a -- which is an
19 OVATION -- OVATION-based system, which is the system
20 that the -- which is the same as the control system in
21 the plant. You see that there is active speed probes
22 off of a seed wheel attached to the rotor, two out of
23 three logic, and that sort of thing, that feed into
24 the -- where you actually open up the valve that dumps
25 the fluid that shuts down the turbine.

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1 The lower train -- you've got passive
2 speed sensors on a physically different speed wheel
3 into an emergency trip cabinet that is not OVATION-
4 based. Once again, two out of three logic into a
5 different valve that opens the fluid that trips the
6 turbine. So this is -- we believe this is equally
7 diverse to having an electrical and mechanical trip.

8 CHAIRMAN RAY: Yes. All right. So the
9 status of that is the ball is in the staff's court
10 now, because --

11 MS. MCKENNA: Yes. I think this was, as
12 you said, very recently --

13 MR. LINDGREN: Like yesterday.

14 MS. MCKENNA: Yes.

15 CHAIRMAN RAY: All right. We need to
16 await your review of it.

17 MS. MCKENNA: Yes, yes.

18 CHAIRMAN RAY: But let me, again, identify
19 to Mike that this is an issue that at the appropriate
20 time needs to be thoroughly reviewed here by the staff
21 with us, so it goes on some punch list.

22 MR. LINDGREN: The operating utilities are
23 doing the same kind of -- the mechanical trip has been
24 problematic in the past, and probably is the largest
25 contributor to unreliability of the turbine, given the

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1 way you have to test it. So it's a --

2 CHAIRMAN RAY: Well, I understand the
3 motivation for not having to test the mechanical trip.

4 Trust me, I do understand that. That doesn't fully
5 satisfy the concern, however.

6 MS. McKENNA: Well, this was an open item
7 in our SER, so that we were --

8 CHAIRMAN RAY: Yes.

9 MS. McKENNA: -- going to be coming back
10 at a future time and obviously --

11 CHAIRMAN RAY: Yes. I just want to make
12 sure that we take cognizance of what the staff's
13 conclusions are.

14 MS. McKENNA: Yes.

15 DR. KRESS: How do you test this device?

16 MR. LINDGREN: This is electronic. You
17 can test this electronically, so you don't --

18 DR. KRESS: You test the sensors coming
19 out?

20 MR. LINDGREN: Yes, you don't have to
21 speed the turbine up to --

22 DR. KRESS: To see if it's getting a
23 signal.

24 MR. LINDGREN: Yes.

25 DR. KRESS: At the speed it's going. And

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1 if it tends to overspeed, how do you know it's getting
2 an overspeed signal? I mean, you are testing at one
3 speed, but it really has to work at a much higher
4 speed. I'm not sure I know exactly how you do that
5 without overspeed testing it. And you can do it in an
6 outside rig someday, yes, I could see that.

7 MR. SISK: I think the actual -- I was
8 looking for the mic. I think we could talk about the
9 actual testing of the sensors later, but it does not
10 require overspeeding. You do crank a signal in, and
11 you can see whether the whole sequence works without
12 actually doing a trip or overspeed on --

13 DR. KRESS: Well, if you guys think that's
14 okay, why --

15 MR. SISK: It is --

16 DR. KRESS: -- have to leave, but I think
17 you need to overspeed that device.

18 MEMBER BLEY: Well, overspeed, except at
19 the sensor.

20 MR. LINDGREN: Nobody who owns a turbine
21 wants to overspeed it.

22 DR. KRESS: No, I don't mean --

23 (Laughter.)

24 -- the turbine. I mean, I think you need
25 to have a way to do it that --

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1 MR. SISK: But I was going to say, if you
2 want a specific, detailed answer, I would defer that
3 to our test people on this NSER to the ISC folks to
4 give you a better read-out on this.

5 MEMBER BLEY: One of you said this is
6 being used in -- or something similar is being used in
7 operating plants. Have some operating plants gotten
8 authorization for this kind of system? And is staff
9 aware of that?

10 MR. CUMMINS: Yes, the operating plants
11 have --

12 MEMBER BLEY: In the U.S.?

13 MR. CUMMINS: Yes.

14 MEMBER BLEY: Any idea which ones?

15 MR. CUMMINS: I don't know, but I --

16 MR. SISK: I don't know that. We could
17 certainly find that out.

18 MEMBER BLEY: They must have been approved
19 by some part of this agency, I assume.

20 MR. CUMMINS: I think it probably was.
21 You can buy these overspeed computer devices from
22 vendors. They sell them, so --

23 CHAIRMAN RAY: Well, the insurance
24 companies are another thing to think about, in terms
25 of what their views are. But in any event, we are not

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1 I think going to run this fully aground here now, so
2 the right thing to do is to identify that it is a work
3 in progress and --

4 MR. SISK: Okay. I think the only other
5 one that Westinghouse had as a specific item --

6 CHAIRMAN RAY: Excuse me. Are we moving
7 away from 9, then?

8 MR. SISK: Yes.

9 CHAIRMAN RAY: All right. Wasn't there a
10 question about the testing of the low-pressure turbine
11 intercept valves?

12 MR. SISK: I do not recall a question on
13 that. I will throw it to my --

14 MS. McKENNA: I don't recall a question on
15 testing. I know there was some degree of confusion,
16 if you will, about the speed control and --

17 CHAIRMAN RAY: Well, the speed control is
18 one thing, but, you know, the most likely reason to
19 overspeed the turbine is you trip the load and the
20 doggone intercept valve doesn't go shut. So you've
21 got the moisture separator sitting there with all of
22 that energy. It just runs it up and overspeeds it.
23 That's what usually happens.

24 And there was a question I thought about
25 reducing the testing of the intercept valves, not the

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1 overspeed detection device, but the closure of the
2 intercept valves.

3 MR. LINDGREN: We are -- as I remember, we
4 have a -- we are saying we're testing every six
5 months, I believe?

6 CHAIRMAN RAY: There was some change in
7 that.

8 MS. McKENNA: Yes, there was a change in
9 the frequency of the testing, yes.

10 CHAIRMAN RAY: Instead of quarterly?

11 MS. McKENNA: Yes.

12 MR. LINDGREN: Part of that is based on
13 having enough experience with those valves in any kind
14 of turbine, but just having some experience with those
15 valves, and that is factored into the evaluation of
16 the probability of an overspeed rotor failure.

17 CHAIRMAN RAY: Yes, that was basically the
18 nature of the discussion, but I didn't think we got
19 closure on it. Basically, what I recall seeing was
20 just basically what you said. We've got enough
21 experience that we can reduce the frequency of this
22 testing, but there wasn't any analysis that showed --
23 well, you know, that sounds good, but can you
24 demonstrate that that is true?

25 And so let's make an item -- I mean, I

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1 would at least like to know if the staff is satisfied
2 that there has been enough showing on the change in
3 the reduction in the intercept valve test frequency to
4 justify that kind of change. It may have gotten
5 conflated with this overspeed detection.

6 MS. MCKENNA: Yes. I think the other
7 thing that was kind of part of that discussion had to
8 do with the assumption on the orientation, whether it
9 was favorable or unfavorable --

10 CHAIRMAN RAY: Yes.

11 MS. MCKENNA: -- with respect to the two
12 units. And so there was a lot of different aspects
13 that were identified at the same time.

14 CHAIRMAN RAY: I think it just got lost,
15 but I definitely recall that the change in -- reduced
16 frequency of testing the intercept valves was
17 something that I picked up on. And I didn't think we
18 closed that. The discussion was exactly what he said,
19 which was, well, we have a lot of experience with
20 these things, and on a probabilistic basis we can
21 reduce the frequency that you have to exercise the
22 valves.

23 But I didn't think that was the end of it,
24 and it just didn't get picked up as an action item
25 here. I would just like some more discussion of that

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1 from the standpoint of the staff's review and if they
2 concur in that, because there is a lot of plants out
3 there that would dearly love to reduce the frequency
4 of closing those doggone intercept valves. And if we
5 are going to do that, we had better be clear-eyed
6 about it and not just have it take place one day
7 because we didn't pay attention.

8 Okay. Proceed.

9 MR. SISK: Well, the last item that I
10 believe Westinghouse had specifically in sharing it
11 with the staff and the COL application was a
12 discussion on turbine missile generation. This kind
13 of goes back to I think what you were just commenting,
14 Eileen, the favorable/unfavorable orientation.

15 I think some of that is going to be
16 discussed tomorrow, but, again, I will defer over to
17 Mr. Don Lindgren.

18 MR. LINDGREN: Yes, we are -- we do
19 include that in the discussion tomorrow on missiles.
20 The short answer is that the analysis of the
21 probability of a turbine rotor failure meets the
22 criteria in the reg guide for a turbine with an
23 unfavorable orientation. I believe it's 10^{-5} , so two
24 AP1000s side by side is no worse than an unfavorable
25 orientation.

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1 CHAIRMAN RAY: Right.

2 MR. LINDGREN: So that has been our
3 approach. It is really -- since we have -- we have a
4 design certification for a single unit, it is really a
5 COL question. But we've answered it on a generic
6 basis.

7 CHAIRMAN RAY: Well, at the time, of
8 course, we were sitting there with an R-COLA in the
9 same discussion.

10 MR. LINDGREN: And these questions -- and
11 we have gotten RAIs on these. I'm not sure whether it
12 was a design certification or a COLA. It's one common
13 answer for all of them, since --

14 DR. KRESS: To get a probability of
15 missile impact for these things, it brings to mind me
16 probability of TRAC initiation, TRAC worth, and with
17 respect to speed -- I thought these were new rotors
18 that you had in these things. Do we have the
19 information that we need to do that probability
20 calculation, those materials, and --

21 CHAIRMAN RAY: The reg guide assumes no
22 change from past history, basically, in calculating
23 frequency, assumed frequency of failure.

24 DR. KRESS: I guess that's okay, if the
25 materials are the same.

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1 CHAIRMAN RAY: That's what I'm saying.
2 I'm just adding a piece of information, which is that
3 the -- I think the reg guide that you referred to says
4 this is what our history has been, and it's --

5 MS. MCKENNA: We have a member of the
6 staff who I think can maybe contribute on this point.

7 CHAIRMAN RAY: Okay. Sure. Please.

8 MR. HONCHARIK: My name is John Honcharik.
9 I'm from DE. And I guess the question initially was
10 whether or not the turbine missile analysis that
11 Westinghouse did provide covered by high and low
12 trajectory missiles. Okay?

13 And I think the first response was that it
14 was only for high trajectory missiles, because the
15 AP1000 single unit is favorably orientated. So low
16 trajectory wouldn't affect any safety component
17 systems. Okay?

18 But I think the problem then arised where
19 you have COL applicants coming in on the dual unit
20 side -- side by side, thereby it's not favorably
21 orientated anymore. Okay? So, then, the Westinghouse
22 responded to that RAI again, and in there they stated
23 that their turbine missile probability analyses were
24 not dependent on the angle of trajectory. It was
25 basically just an analysis, a fracture of the rotor.

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1 So it did not matter where -- what angle
2 the piece flew out of. So basically you can use that
3 analysis for both high and low trajectory. So it was
4 more of I guess a misunderstanding between, you know,
5 a single unit and the dual unit, you know, because for
6 a single unit you don't have to worry about low
7 trajectories.

8 MEMBER BLEY: That doesn't answer the
9 question Tom Kress just asked. Are the new rotors of
10 different material than the old ones? And if they are
11 different, why do we have any confidence in the crack
12 initiation idea that -- or quantification that we have
13 used up until now?

14 MR. HONCHARIK: Most of the rotors are --
15 have similar materials. The analysis basically takes
16 the material properties and then assimilates -- say
17 that, okay, if you were to do an inspection on it and
18 miss a flaw of a certain size, what would be the
19 likelihood of it propagating before you could inspect
20 it and detect it?

21 DR. KRESS: That brings to mind the
22 question of: do you inspect these?

23 MR. HONCHARIK: Yes, they usually have an
24 inspection I think for the AP1000 -- is every 10
25 years, based on a probability analysis.

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1 MEMBER BLEY: Now, I was under the
2 impression -- and this might be a wrong impression --
3 that the new technology of the way the rotors and the
4 disks are put together have eliminated some of the
5 sources of cracks we have had in the past. And if
6 that's true, you would think you would be getting
7 lower probability of getting a crack that propagates.
8 Can you say anything about that?

9 MR. HONCHARIK: Yes. Like this one is --
10 Westinghouse proposed to use an integral forging,
11 which is basically one-piece forging, instead of
12 several pieces put together and then put onto a shaft,
13 so there is less likelihood of, say, a defect being
14 presented there. So in that case, yes, you are right.
15 An analysis did show that, but yet they are still
16 going to propose a 10-year inspection interval.

17 CHAIRMAN RAY: That's not a bad idea.
18 You've got to convince more than the NRC. You've got
19 to convince the insurance underwriter also.

20 MR. LINDGREN: And your comment about the
21 frequency of the valve testing also factors into this
22 evaluation.

23 MR. HONCHARIK: Yes, and I think -- I'm
24 not sure. I thought there was an analysis done for
25 the turbine valve stop --

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1 MR. LINDGREN: I believe there is.

2 MR. HONCHARIK: -- frequency.

3 CHAIRMAN RAY: Yes, we just didn't --

4 MR. LINDGREN: You haven't been privy --

5 CHAIRMAN RAY: -- review it or consider it
6 in any detail when it was discussed earlier. Okay.

7 MR. SISK: Does that address the question
8 on --

9 CHAIRMAN RAY: All right. We'll have to
10 wait and see here. I guess, Tom, the issue that you
11 have would not be satisfied other than by saying,
12 "Well, we are confident that modern turbines are at
13 least as good as those that are the basis for the
14 regulatory guidance that we presently use."

15 DR. KRESS: Yes, I think that would
16 satisfy it, particularly if they have this 10-year
17 inspection.

18 CHAIRMAN RAY: I think that was the
19 presumption everybody brought to the discussion
20 before, which is, well, we don't -- we are not looking
21 to increase the margin or reduce the assumed frequency
22 of a missile generation, because it's quite low
23 already. And so it's not something that we have tried
24 to push.

25 DR. KRESS: And it also looks like it is

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1 taking advantage of the experience to make it less
2 vulnerable. So those things tend to satisfy me on
3 this issue.

4 CHAIRMAN RAY: All right. Okay. So is
5 that the end of the Westinghouse items?

6 MR. SISK: I believe that -- yes, at least
7 the formal questions you had on your list, Mr.
8 Chairman.

9 CHAIRMAN RAY: Okay.

10 MR. SISK: If you had others --

11 CHAIRMAN RAY: We probably will have, but
12 first I want to give Eileen a chance to finish up on
13 her items.

14 MS. McKENNA: Okay. Well, one of the
15 items that we had that I am just going to speak to
16 briefly was item 8, which had to do with the pressure
17 temperature limits reports, and I think there was some
18 degree of confusion perhaps at our last meeting with
19 respect to how that information was captured in the
20 technical specifications.

21 This is -- you know, and the similarity to
22 things like the core operating limits report where
23 there is a methodology that is agreed to that is then
24 used on a cycle-specific basis to generate a specific
25 curve or set of parameters that are used to control

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1 the plant during operation.

2 And, you know, there was some perhaps
3 impression that they were -- something was not in the
4 tech specs. What's in the tech specs is the method --
5 the use of the methodology to develop the curves, and
6 then the requirement that they follow those curves,
7 obviously, during the particular cycle of operation.

8 And there is a specific reporting
9 requirement in the case of like the pressure
10 temperature limits that is also in the tech specs that
11 they provide on each cycle. "Well, here is the curve
12 we are going to use, you know, based on the analysis."

13 And, you know, the idea being that these
14 limits curves that we expect to change from cycle to
15 cycle, you know, this is kind of an experience,
16 lessons learned from back in the '90s of a lot of
17 repetitive license amendments that were doing little
18 more than on a cycle-by-cycle basis reviewing -- we
19 generated the new curve using the same method we have
20 already -- you have already seen before, NRC.

21 And so there was an improvement item to
22 relocate the actual curves, if you will, out of the
23 tech specs and control it within the tech specs by
24 requiring that this particular methodology that is
25 approved be used to come up with particular curves,

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1 and then follow them of course during the plant
2 operation.

3 DR. KRESS: Do you ever audit these
4 calculations to see if they were done correctly by the
5 methodology?

6 MS. McKENNA: They are submitted. I can't
7 speak, since it is primarily experience on the NRR
8 side of business, so --

9 DR. KRESS: Before they go ahead and
10 restart --

11 MS. McKENNA: Yes, that's basically what
12 -- on both sides, basically like the core and upper
13 limits, they have a requirement to submit the report.
14 It's available for the staff. I would have to
15 inquire of them as to how much audit and review they
16 might do of those. There is a degree of similarity,
17 obviously, over time that -- in that calculation.

18 DR. KRESS: I mean, I wouldn't expect too
19 many.

20 MS. McKENNA: Correct. You know, and I
21 think also, you know, the staff does see the results
22 of the curves, of the analysis. So if something
23 looked really off, I think that would be a reason to
24 inquire.

25 DR. KRESS: They should look about the

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1 same.

2 MS. McKENNA: Yes, yes.

3 CHAIRMAN RAY: All right.

4 MS. McKENNA: I think most of the other
5 ones were more related to things like the COLs or will
6 come up in, you know, something on -- that we wouldn't
7 -- isn't really suitable for this kind of meeting. I
8 think aircraft impact we know the Committee is
9 interested in, and we will be having a separate
10 briefing when the staff is ready with the results.

11 CHAIRMAN RAY: What is the status of 10?

12 MS. McKENNA: Ten, the elbow taps. Yes,
13 I'll say that one kind of caught me -- so the
14 background information -- we'll have to cover that --
15 have a separate discussion as to -- make sure we
16 understand what background information we have that we
17 need to provide, because I thought there was kind of a
18 different method that had been talked about in July.

19 MR. SISK: Well, we have an open item that
20 we are working with the staff that --

21 MS. McKENNA: Okay.

22 MR. SISK: -- as indicated here. The
23 alternate testing method includes using elbow taps,
24 which is an open item. We have not resolved that
25 issue yet, and we are not ready to -- I don't think we

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1 are prepared to go into details just yet on the
2 results of that evaluation or that testing.

3 CHAIRMAN RAY: All right. So these
4 relevant Westinghouse submittals are prospective, not
5 something that has happened already.

6 MS. McKENNA: Correct.

7 CHAIRMAN RAY: Okay. Could you note that,
8 Mike, please.

9 MS. McKENNA: Yes. I didn't think we had
10 anything in-house that I could send you on that.

11 MR. SISK: Well, there was I think a
12 question earlier about elbow taps or something along
13 that line, other --

14 MS. McKENNA: Yes, there was. I said
15 that's what -- the item had to do with how the -- the
16 uniformity of the flow measurement using these and the
17 -- I think the intent was that this was perhaps a more
18 accurate method than doing the heat balance to measure
19 flow. And, let's see, and --

20 CHAIRMAN RAY: What is 17? It's too
21 obscure for me to figure out what that is.

22 MS. McKENNA: Well, I think this is
23 related to the questions that came up partly when we
24 were talking about like the non-condensables, with
25 respect to whether there was plans to do the different

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1 kinds of testing, whether it was if you will proof
2 testing that may have been done in the past to
3 demonstrate that the concepts --

4 CHAIRMAN RAY: Okay. Those are questions
5 Said was asking.

6 MS. MCKENNA: Yes, yes. And then
7 questions about like the first of a kind -- the first
8 of -- first plant test or the first three tests versus
9 the ones that are more the ITAAC kind of test where,
10 you know, on a plant-specific basis you are looking
11 at, say, the flow resistance in a particular line or
12 something like that.

13 And there was some degree of perhaps
14 suggestion that some in situ, if you will, testing on
15 non-condensables be done, and I don't think that it
16 was -- the staff or Westinghouse was in a position to
17 agree that that was an appropriate thing to do. So I
18 think that's where there was some degree of confusion
19 about the different kinds of testing that are done and
20 what's their purposes.

21 CHAIRMAN RAY: Well, and so what's the
22 fate of that issue? That's part of what is going to
23 be discussed --

24 MEMBER BLEY: Item 2?

25 CHAIRMAN RAY: Yes.

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1 MS. McKENNA: Well, I think the specific
2 information on the non-condensables will be in item 2
3 where, as was indicated, they -- Westinghouse does
4 plan to discuss --

5 CHAIRMAN RAY: Right.

6 MS. McKENNA: -- what testing, what
7 analysis --

8 CHAIRMAN RAY: Okay.

9 MS. McKENNA: -- what other information
10 they have. You know, in a more general context, if
11 there is still interest in going through testing, then
12 that would have to be some issue we would have to
13 perhaps discuss at a future time.

14 CHAIRMAN RAY: Well, I know that Said is
15 very -- remains concerned about that, and we've got to
16 make sure that he is lined up with that discussion.

17 MS. McKENNA: Right.

18 CHAIRMAN RAY: And we will assume that 17
19 pertains to that as well.

20 PARTICIPANT: 19.

21 CHAIRMAN RAY: Yes, 19 we'll come to in a
22 minute, because we are going to turn the floor over to
23 Dr. Ryan here in a second.

24 Information on digital I&C failure rates.
25 It says we've got to view the transcript to better

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1 understand the item. Member Brown is in the Far East
2 today and not with us. I think we will just have to
3 carry that, because I'm not sure there is anything --
4 Dennis, do you have any --

5 MEMBER BLEY: On which ones?

6 CHAIRMAN RAY: 20.

7 MEMBER BLEY: We're -- I think all of us
8 are a little skeptical about however that might have
9 been done, but if there is information on where the
10 failure rates came from --

11 MS. MCKENNA: Yes. I think this was in
12 the context of what was considered in the PRA and what
13 -- you know, how common cause and those kinds of
14 things were considered.

15 CHAIRMAN RAY: Well, what's the action
16 that we should take here? There was a lot of feeling
17 that we didn't have a complete and adequate discussion
18 on PRA. Are we going to come back to that?

19 MS. MCKENNA: Certainly, if there's areas
20 that -- you know, there were some open items,
21 obviously, in PRA, so we were planning to come back on
22 that.

23 CHAIRMAN RAY: Well, are we going to need
24 to identify anything to you as an issue or --

25 MS. MCKENNA: I think this one

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1 specifically, if you want further on this after you
2 hear Chapter 7, I think we might need to kind of
3 identify a little more clearly what is the specific
4 tasking or request that is being sought.

5 CHAIRMAN RAY: Will that be an adequate
6 time to answer that question when we hear Chapter 7?

7 MS. McKENNA: Well, we are hoping to do
8 Chapter 7 in November, so I think there should be
9 time.

10 CHAIRMAN RAY: November will be a busy
11 time, won't it?

12 MS. McKENNA: Yes, it will. Enjoy this
13 meeting.

14 MEMBER BLEY: That wouldn't come up --
15 this topic wouldn't come up naturally in Chapter 7.

16 MS. McKENNA: No, it wouldn't, because, as
17 we said, it is really more of an outcome of that and
18 how it affects PRA. What it might help understand is
19 to what degree those failure rates -- the concern
20 about the failure rate, given what the configuration
21 of the I&C might be.

22 MEMBER BLEY: I guess I have a question.
23 We are bringing -- at least this morning we went
24 through the human factors engineering side and saw
25 that we were bringing a great deal of essentially all

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1 of that out of the DAC area and up into the current --

2 MS. McKENNA: Yes.

3 MEMBER BLEY: -- design cert. Given we
4 have more information now on training and procedures
5 that we expect, there could certainly -- and some of
6 the other things that are being done, the PRA could
7 certainly be updated to get much closer to what you
8 would expect at a COLA time. Is the PRA being
9 updated? Has it been updated at all? I wasn't here
10 at that last meeting, I apologize. I had a previous
11 commitment.

12 MR. SISK: Where we are with the PRA right
13 now?

14 MEMBER BLEY: Yes.

15 MR. SISK: We are evaluating the changes
16 to the PRA. We have not done a full update to the PRA
17 at this point in time.

18 MEMBER BLEY: Will it be updated as part
19 of the DCD 17 design review that is going on? Part of
20 18, or 19, excuse me, but I don't believe that -

21 MR. CUMMINS: This is Ed Cummins.
22 Basically, there are some RAIs that demand some
23 specific little things in the PRA. And I think that
24 the answer to your question is no. There is -- part
25 of 10 CFR 52, the latest revision, requires a -- we'll

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1 call it a site-specific PRA a year before core load,
2 meeting the requirements of everything a year before
3 core load.

4 MEMBER BLEY: So that will be the next
5 major change.

6 MR. CUMMINS: Yes. We are talking about
7 how we try to do some standardization among the
8 various customers, so that it works out reasonably.
9 But that will be the next major thing. There will be
10 some RAI response kind of tweaks to it.

11 MS. McKENNA: Yes, I think they --

12 MEMBER BLEY: So you could just probably
13 consider this item 20 as a heads-up that there will be
14 some real questions about how the digital I&C was
15 incorporated in the PRA at that point in time for
16 sure.

17 MS. McKENNA: Right. Because I think as
18 we said, I think the specific open items we had were
19 more in -- there was some requantification of some,
20 you know, effects of some of the other changes, and
21 things like that that needed to be done, but not what
22 I think is in the terminology of an update, which is
23 different from --

24 CHAIRMAN RAY: From what I understood from
25 Ed, though, there is no review that takes place then

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1 that would involve us, for example.

2 MR. CUMMINS: Ed Cummins again. I think
3 the question, to answer that question is, to what
4 extent did we change the PRA from Rev 15 to Rev 17?
5 And I'm not sure I'm the expert. But we did change
6 the PRA from Rev 15 to Rev 17, and one of the aspects
7 of it is we put in correctly just I&C information now.
8 So we did model the I&C that we are actually using in
9 the design, in the PRA specifically.

10 And I think there is a lot of questions
11 that I'm not competent to talk about about whether you
12 even can model I&C and PRA, but -- so we thought we
13 did anyway.

14 MEMBER BLEY: Well, Eileen, I think on
15 this item 2, in follow-up we would love to see some
16 real detail on that addition of the I&C to the PRA and
17 the basis for what was done.

18 CHAIRMAN RAY: At least in the Chapter 7
19 meeting tell us when we will be able to pursue that.

20 MEMBER BLEY: We have that full analysis
21 in addition to just Chapter 19, do you not? I haven't
22 seen it.

23 MS. McKENNA: I'm sorry. Which analysis?

24 MEMBER BLEY: The PRA itself. They must
25 have done a requote on the PRA.

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1 MS. McKENNA: There was -- I will call it
2 a Rev 15 PRA that was submitted. And since then, we
3 have seen some of the changes and results, and we are
4 working on getting that information into the DCD. I
5 know the staff has done some audits, and they have one
6 coming up next week I think it is, as a matter of
7 fact.

8 So I may put a little encouragement in
9 them to, you know, make sure they are prepared on this
10 point for, you know, some --

11 CHAIRMAN RAY: All right. But listen --

12 MS. McKENNA: -- action.

13 CHAIRMAN RAY: -- here is what I think we
14 should do is, as a result of this meeting, we will
15 make a new action item, based on what Eileen has just
16 said, to revisit the status of the PRA at a future
17 meeting, and let -- between the ACRS staff and NRO
18 staff -- this issue be made when and how that will
19 happen.

20 We've had enough discussion here it seems.

21 Is that satisfactory, Dennis?

22 MEMBER BLEY: Yes. Perfect.

23 CHAIRMAN RAY: All right. But we need to
24 keep an open item list as a result of what we are
25 doing.

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1 Anything else in this list here before I
2 move on to the next subject? We've got one item,
3 item 19, that we are going to come back and talk about
4 in just a second.

5 MS. MCKENNA: No, I don't have anything
6 else. Anything else over here? No? Okay.

7 MR. SISK: No, I think we're covered.

8 MS. MCKENNA: Yes.

9 CHAIRMAN RAY: Okay. We are going to at
10 least begin a discussion now which, unfortunately, we
11 were not able to align our Committee expert on the
12 areas in Chapters 11 and 12, which were reviewed in
13 July with his availability then. And, at this point
14 in time, what I would wish to do is give him an
15 opportunity to indicate things that we would like to
16 have addressed in the future, probably, maybe they can
17 be addressed now, but I leave that up to him.

18 But, in any event, based on what he has
19 been able to do subsequent to the July meeting, I
20 would like him to have a chance to identify things
21 that need some further attention. One of them we will
22 wrap in as -- however he sees fit, this item 19 on
23 what I'll call the July punch list. We'll make a new
24 punch list out of this meeting. Okay?

25 So with that, let me invite Dr. Ryan to go

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1 ahead and pursue his areas of inquiry.

2 MEMBER RYAN: Thanks, Mr. Chairman.

3 Again, by --

4 MR. SISK: Mr. Chairman, if I may, one --

5 CHAIRMAN RAY: Sure.

6 MR. SISK: Our subject matter expert for
7 Chapters 11 and 12 is not here today.

8 CHAIRMAN RAY: I understand.

9 MR. SISK: I was going to say, your
10 choice, if you give me a few minutes we could
11 certainly patch him in by phone to listen, or if you
12 would like to go through the questions --

13 CHAIRMAN RAY: I am happy to have you do
14 that, or --

15 MR. SISK: Your call.

16 CHAIRMAN RAY: -- if you want to just take
17 them as actions for down the line, that's fine.

18 MS. McKENNA: Yes, I don't think we have
19 the staff members here either, so the --

20 CHAIRMAN RAY: Yes. I'm sure he's not
21 prepared to --

22 MS. McKENNA: Right, right.

23 CHAIRMAN RAY: -- you know, jump up and be
24 on a phone call, so that's --

25 (Laughter.)

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1 MR. SISK: If there is something you
2 desperately want to address after you've heard what
3 Mike has to say, then we can certainly arrange today
4 or tomorrow still to get him on the phone.

5 MS. MCKENNA: Exactly. And, if not, then
6 it will be on the transcript and we will have it
7 available for future --

8 CHAIRMAN RAY: But for now, anyway, I have
9 asked Mike to take this time to tell you the things
10 that he would like to hear more about that were part
11 of the July meeting but not adequately addressed by us
12 at that time.

13 MEMBER RYAN: Thank you. Again, by way of
14 introduction, I joined the Subcommittee shortly before
15 I was unable to attend the first meeting in July,
16 after I joined. I had a previous commitment that just
17 wasn't changeable, so I appreciate your patience with
18 me today.

19 I guess let's start with this one on the
20 action item list. What is meant by "rad significant"?

21 Boy, I guess I'd like to know that, too.

22 (Laughter.)

23 I mean, I don't really understand the
24 question I guess.

25 MS. MCKENNA: Well, my recollection of

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1 this was there had been a recent letter from the
2 Committee on some guidance that had been prepared, and
3 the recommendation was that the guidance not be issued
4 until that term had been better characterized.

5 My recollection from the meeting was that
6 we were kind of informed of that recent letter from
7 the Committee. I'm going back to my notes.

8 MEMBER RYAN: No, that doesn't ring a
9 bell.

10 MS. McKENNA: Doesn't ring a bell? Hmm,
11 I'm going back to my notes here.

12 MS. MONROE: Eileen?

13 MS. McKENNA: Yes.

14 MS. MONROE: This is Amy Monroe from
15 Southern Nuclear Operating Company. That question did
16 have to do with NEI template 08-08. That's where the
17 definition of --

18 MS. McKENNA: Oh, is that where it was?

19 MS. MONROE: -- and that's the one in
20 question.

21 MEMBER RYAN: Oh, the NEI 08-08. Okay.
22 And what was the question about the definition? I'm
23 not sure of the context. And, again, forgive me for
24 not --

25 MS. MONROE: I don't recall the exact

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1 question.

2 MEMBER RYAN: Okay.

3 MS. MONROE: It is reflected in the
4 letter.

5 MEMBER RYAN: I'll tell you what, I'll
6 look at the letter and then maybe --

7 MS. MCKENNA: Yes. My notes said that
8 this came from a July 22nd letter that the Committee
9 had issued. Yes, and as Amy said, it was on NEI
10 template 08-08, and the concern had to do with this
11 term. And what was said at the meeting was that the
12 ISG should not be issued until -- and the NEI document
13 should not be endorsed I guess until there was some
14 understanding of what that term meant.

15 CHAIRMAN RAY: Does it pertain to the DCD
16 or to the R-COLA?

17 MS. MCKENNA: Not -- more to the COLA,
18 because this is the template that they would use to
19 assist. That's why Amy was the one who was speaking,
20 because she is with Southern.

21 MEMBER RYAN: Maybe we can both do a
22 little homework, and I will certainly --

23 MEMBER SHACK: Well, I have the letter, if
24 you want to know what the recommendation was.

25 MS. MCKENNA: Okay, great.

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1 MEMBER RYAN: Okay. Thank you.

2 MEMBER SHACK: The definition of the term
3 "radiologically significant" in NEI 08-08 should be
4 changed by revising the significance threshold to
5 address unexpected radiological condition resulting
6 from spills, leaks, unplanned releases, or the
7 identification of radioactive materials in unexpected
8 locations that could have an adverse impact on license
9 termination under Subpart E of 10 CFR Part 20.

10 MEMBER RYAN: Now I know exactly what it
11 means.

12 PARTICIPANT: Is this ALARA?

13 MEMBER RYAN: No, it is not. What it
14 tries to address, as I understand, if we want to go
15 there, the tritium task force kind of --

16 MEMBER SHACK: Yes.

17 MEMBER RYAN: You know, having a leak that
18 is compliant --

19 MEMBER SHACK: It's your letter, Mike.

20 (Laughter.)

21 MEMBER RYAN: So it really is more,
22 instead of just an ALARA issue, operating -- it tries
23 to get into the NEI 08-08 treatment of the tritium
24 task force results, and how you are going to prevent a
25 little bit of tritium from turning into a great big

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1 problem, or anything else for that matter.

2 So I think there's two elements to that,
3 from my point of view. And, again, I would be happy
4 to have your insights to have me adjust my thinking.

5 One is, how have you dealt with it in
6 design space for things like the rad waste system and
7 other places where these things tend to pop up,
8 blowdown systems, and others? And then, how have you
9 increased your programmatic efforts for identification
10 and remediation, if you do find them?

11 So that's -- so I know those are very
12 broad questions, and I would be happy to have you
13 refine them for us as you come back with an answer.
14 But I think that's really the key. So I know that's a
15 relatively new thing from NEI, but you've been at this
16 a lot longer than, you know, NEI has been out on the
17 street with that, so I'd appreciate any insights you
18 could share.

19 MS. MCKENNA: Yes. As I said, I don't
20 think we have the right people here. I do know, for
21 example, you mentioned design. We did have -- in
22 fact, I think it still -- it was an open item in our
23 Chapter 12 SER to look at some specific aspects, which
24 were based on some of this operating experience.

25 And I think the question had to do with

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1 our ventilation systems, whether there were places
2 where you could get condensation that might be
3 trapped, and that kind of thing. And we did have a
4 question to Westinghouse on that point.

5 You know, more generally I think on the
6 whole subject of minimization and contamination, you
7 know, in the Chapter 12 discussion there had been some
8 effort by Westinghouse to go through the various
9 features and techniques they have gone through to try
10 to minimize possible contamination through how you
11 encapsulate things or materials you use or how you
12 route things, that type of thing.

13 And the staff had reviewed that, and then
14 there was the specific item that I think, you know, as
15 the task force things were going on kind of in
16 parallel, there was this concern that maybe a couple
17 of specific items like the ventilation thing had been
18 missed, so there was a -- kind of a -- it was kind of
19 an open item before we had the RAI, one of those kind
20 of last-minute items to make sure that this particular
21 aspect had been caught. But that's probably as far as
22 I should go without having the staff members here in
23 the room.

24 MEMBER RYAN: That's what I was thinking.

25 If we can revisit that, that would be very helpful.

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1 I also appreciate the fact that, you know, a facility-
2 specific R-COLA is really where you marry the facility
3 to the property, so -- and a lot of the issues of
4 08-08 are relative to environmental monitoring.

5 MS. McKENNA: Yes.

6 MEMBER RYAN: And that, of course, is
7 environment-specific, so I appreciate the fact there
8 is going to be some separation where you can't address
9 what is -- you know, what are the environmental
10 aspects.

11 MS. McKENNA: Correct.

12 MEMBER RYAN: You can look at the leak
13 aspects, but where it goes from there and how it's
14 addressed, and how you monitor and how you do early
15 detects, and all of that, there has got to be some
16 obvious breakpoint there.

17 MS. McKENNA: Yes.

18 MEMBER RYAN: So we appreciate that aspect
19 of it.

20 MS. McKENNA: And while this today is not
21 a COL meeting, at our July meeting we did discuss
22 Chapter 12 on the COL side. I would certainly
23 encourage you to look at the information that was
24 presented in that SER --

25 MEMBER RYAN: Yes. If you can provide

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1 some of the writeups --

2 MS. McKENNA: Yes.

3 MEMBER RYAN: -- it's not as rich as
4 hearing the whole discussion.

5 MS. McKENNA: Correct.

6 MEMBER RYAN: I appreciate that very much.

7 MS. McKENNA: Understand. Okay.

8 MEMBER RYAN: I will go back and mine the
9 transcript a little bit on it.

10 MS. McKENNA: Okay. Great.

11 MEMBER RYAN: A couple of things. Let's
12 see, let me -- hang on a second. Here they are.
13 Adding three rad waste techs seems like a fairly
14 substantial change to me.

15 MR. SISK: We will -- I believe we are
16 talking about that -- we talked about that on
17 Chapter 11.

18 MS. McKENNA: Yes.

19 MR. SISK: 11 and 12.

20 MR. LINDGREN: They are monitor tanks.

21 MS. McKENNA: Yes.

22 MEMBER RYAN: Okay.

23 MS. McKENNA: Monitor tanks, yes.

24 MR. CUMMINS: This is Ed Cummins. This is
25 when the customers requests, and I believe it was

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1 driven by a particular customer. We respond to
2 customer requests only when all of the customers
3 agree. So they all did agree on this. But I think it
4 was driven by a particular customer who wanted to be
5 able to discharge tritium when the lake conditions
6 were right and not when the lake conditions were
7 wrong.

8 And so these are -- they are clean. They
9 have been processed through the minimizers, and they
10 are clean except for basically tritium. So --

11 MEMBER RYAN: Almost all.

12 MR. CUMMINS: Almost all. Almost all.

13 MEMBER RYAN: Almost all, except tritium.

14 MR. CUMMINS: Yes. I'll let you be the
15 expert there.

16 MR. SISK: Was there a specific concern,
17 or is that just an observation?

18 MEMBER RYAN: I was just curious why --
19 and that explains it, the hold-up tanks are discharge,
20 which I appreciate. But it seems like everybody has
21 incorporated that as a customer group, so --

22 MR. CUMMINS: Yes. Someone said that it
23 remains where the water is stored, and so they all
24 kind of agreed.

25 MS. McKENNA: Kind of as a general matter,

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1 if it's going to be done for all COLs, it's part of
2 the amendment. If there was, for example, one
3 particular customer who for whatever reason wanted to
4 do something on their own, that would be done on a
5 plant-specific basis as part of the COL.

6 MEMBER RYAN: Right.

7 MS. McKENNA: So --

8 MEMBER RYAN: I'm with you. Okay. And
9 that, again, seemed like a bigger change at this stage
10 of the game, and I was just curious why. That helps
11 explain it.

12 MS. McKENNA: Right.

13 CHAIRMAN RAY: Nothing further on that.

14 MEMBER RYAN: Nothing further on that, no,
15 that's fine.

16 MS. McKENNA: Okay.

17 MEMBER RYAN: One thing I was going to
18 offer to you as a bit of information, there are two
19 projects underway regarding the GALE code. The staff
20 is updating it with regard to the basic software or
21 framed software approach, and they have a development
22 and support project out on that. And also, an effluent
23 monitoring for new reactors effort.

24 So I noticed in -- I forget whether it was
25 11 or 12 -- somebody had used the GALE code, had done

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1 some GALE code work. And I just want to give you a
2 heads-up that's under revision. Now, the old GALE
3 code, which the ACNW wrote a letter on, is written in
4 FORTRAN, and it's not well documented. Anybody that
5 remembers FORTRAN knows if you don't have a lot of
6 comment lines in there, you are not going to really be
7 able to figure it out very easily.

8 So that's why these two projects I think
9 got started was they knew that had to be updated.
10 And, again, I just offer you that as an insight from a
11 past life on the ACNW, that that might be something
12 you want to poke around in and just make sure you
13 understand where that is going and if that has an
14 impact on anything you are interested in doing.

15 MR. SISK: Excuse me. Just for
16 clarification, you said there are two items. I picked
17 up the effluent monitoring for new reactors. What was
18 the first item?

19 MEMBER RYAN: Oh, I'm sorry. It was two
20 projects. One is kind of -- let me just read the
21 words here. It's developing what's called a framed
22 software system, and it's a development and support
23 effort to redevelop the code in that -- on that
24 platform I guess. And the second one is effluent
25 monitoring of new reactors.

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1 And I can give you the project numbers, if
2 that's helpful for you. The first one on frames is
3 N6573, and the next one is N6644.

4 MR. SISK: Thank you.

5 MEMBER RYAN: So that's just an
6 information item for you on that one. Let me see.
7 Let me get back to radiation monitoring.

8 I guess I always keep in my head that
9 NEI's number that the average worker exposure in a
10 plant these days is two rem. How does your projection
11 for worker exposure line up with current projections?

12 MR. SISK: I don't have that number off
13 the top of my head. I'll look around the room. We
14 can get you an answer.

15 MS. McKENNA: We discussed this in some of
16 the slides at the last meeting. I'm looking at Amy,
17 because I know you talked about this, you know, the
18 worker exposure. Didn't we have a slide on that?

19 MEMBER RYAN: It didn't really say
20 anything real specific.

21 MS. McKENNA: Maybe I'm thinking of
22 something different.

23 MEMBER RYAN: They were looking at gaseous
24 effluent.

25 MS. McKENNA: Maybe that's what I was

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1 thinking of.

2 MEMBER RYAN: But not so much our workers.
3 That's kind of why I asked the question.

4 MR. SISK: If you can just get back to us.

5 MS. McKENNA: Yes.

6 MEMBER RYAN: So if you just get back --
7 and I would be curious, if you have a report, for
8 example, that kind of gives the buildup of, you know,
9 how you did your worker-dose assessments, time and
10 motion studies, and other things that you might have
11 done, that would be helpful.

12 MS. McKENNA: Yes, I mean, I know there
13 were in some specific areas like we have questions on
14 DCD on, you know, like in the fuel handling and, you
15 know, because -- the effects of the head package, that
16 kind of thing, but that's kind of very specific as
17 opposed to an average value or maximum value you might
18 expect on a worker basis.

19 MEMBER RYAN: Yes, you did those specific
20 things. We had changed the height of the --

21 MS. McKENNA: Yes, exactly.

22 MEMBER RYAN: You know, there were a
23 number of questions that came up already. But if you
24 just have some general information on how you built
25 that up, that would be helpful to me.

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1 MS. McKENNA: Okay. As I said, you
2 know --

3 MR. SISK: I'm sure --

4 MS. McKENNA: Yes.

5 MR. SISK: -- has that. We could probably
6 get --

7 MS. McKENNA: And the same thing with --
8 with the right staff I'm sure we could answer those
9 questions fairly expeditiously.

10 MEMBER RYAN: That would be terrific.
11 Let's see. I think that was it on the waste
12 management side.

13 One other question on waste management is,
14 again, do you have any kind of forecast for waste
15 generation?

16 MR. SISK: Again, we do. I don't have the
17 number. That has actually been a discussion question
18 that we have. I'm kind of looking around to the floor
19 here again to see if anybody has the number handy.

20 MEMBER RYAN: I'm happy to get it later.
21 That's fine. Just --

22 MR. SISK: We would be happy to.

23 MEMBER RYAN: -- put that on the list.
24 That would be --

25 MR. SISK: Okay.

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1 MEMBER RYAN: That would be real helpful.

2 Going, again, a little bit by category and
3 type and, you know -- and spent fuel don't worry
4 about. That's off the table. I'm thinking of
5 operating --

6 MR. SISK: A, B, and --

7 MEMBER RYAN: Yes, operating list. Yes.
8 I think I understand the reduction of the capacity of
9 the charcoal delay beds by 50 percent. But could you
10 tell me why you ended up with that? Is that a
11 reduction in waste generated? I mean, you're getting
12 the same performance for delay with a smaller bed.

13 MR. LINDGREN: This is Don Lindgren. I
14 will attempt to answer this. We have two that we --
15 initially, we thought that one would be sufficient to
16 handle the load. Based upon some new information that
17 I think related to the effective humidity, we had to
18 de-rate the capability.

19 One was no longer available -- sufficient,
20 so we needed to put the two of them into series. So
21 now we only have one -- effectively one delay bed,
22 instead of two. That is really my understanding, I
23 mean, because we had --

24 MEMBER RYAN: So reduce the capacity of
25 the charcoal delay beds by 50 percent. So that means

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1 you reduce the capacity by calculating that with
2 humidity that 50 percent effective --

3 MR. LINDGREN: Well, we had to put two in
4 series, instead of --

5 MS. MCKENNA: Well, I think what you are
6 maybe saying is that you -- the capacity perhaps was
7 changed based on the moisture, is that --

8 MR. LINDGREN: Yes. Well --

9 MR. CUMMINS: This is Ed Cummins. The
10 physical design was not changed at all. But the
11 ability of the existing design, the capacity of the
12 existing design was changed by a factor of two,
13 because of this humidity or temperature, some
14 combination of humidity and temperature.

15 MEMBER RYAN: Relative humidity issue.
16 Okay.

17 MR. CUMMINS: Yes.

18 MEMBER RYAN: I understand that. That's
19 fine.

20 MR. CUMMINS: And that's it.

21 MEMBER RYAN: I was going to say, if
22 you've got really snazzy charcoal that you can only
23 use half of it, let us all --

24 (Laughter.)

25 That would be a neat thing to have.

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1 Let's see.

2 MR. CUMMINS: This is Ed Cummins again. I
3 got some help from our customers who remember that it
4 was absorption coefficient for xenon and krypton that
5 particularly was of interest.

6 MEMBER RYAN: Gotcha. Thank you very
7 much. I appreciate it.

8 I think that's it, Mr. Chairman. Thank
9 you.

10 CHAIRMAN RAY: All right.

11 MEMBER RYAN: That's kind of the questions
12 that struck me from taking a look at the slides and
13 the writeups that went with it. But, again, I have
14 not yet had a chance to mine the transcripts, but I
15 appreciate the help.

16 CHAIRMAN RAY: So there's two or three
17 items there that we will hear more about when it's
18 appropriate.

19 Okay. We have one more item today, but
20 first we will take a break. We are just five minutes
21 behind the scheduled time. So we will resume at 2:50,
22 please.

23 (Whereupon, the proceedings in the
24 foregoing matter went off the record at 2:33 p.m. and
25 went back on the record at 2:49 p.m.)

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1 CHAIRMAN RAY: All right. The hour now
2 having arrived and passed, we will take up Section 3.4
3 and finish the day with a discussion of flooding
4 protection.

5 MR. SISK: Mr. Chairman, if I may, just to
6 respond back to a question from the --

7 CHAIRMAN RAY: All right.

8 MR. SISK: -- Committee, Dr. Ryan was
9 asking a question about the dose for the plant. I
10 just wanted to comment that the overall plant doses
11 are in the DCD Section 12.4.1.7.

12 And just to put the number on the record
13 here, the estimated annual man-rem for AP1000 in the
14 DCD at this time is 67.1. Also, with regard to the
15 waste generation --

16 MS. McKENNA: The units?

17 MR. SISK: That's man-rem.

18 MS. McKENNA: That's the cumulative.

19 MR. SISK: That's cumulative, total man-
20 rem. I'm sorry.

21 (Laughter.)

22 Also, the question was regarding the waste
23 generation and the various categories. That can be
24 found in Table 11.4-1. I won't read through the
25 table. There is a breakdown, but I wanted to at least

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1 point the Committee to the appropriate location.

2 MEMBER RYAN: Thank you, Rob. That's very
3 helpful. I appreciate it.

4 MR. SISK: Not at all.

5 With that, then, I will -- I think the
6 next thing on the agenda, as indicated, Mr. Chairman,
7 was Section 3.4. And with that as -- where we are at
8 this point, I think we're going to follow through
9 Chapter 3. Everybody got a copy of Chapter 3 slides?

10 CHAIRMAN RAY: We do.

11 MR. SISK: Because they are in the order
12 of the agenda, so we will start with 3.4. And, once
13 again, I will turn it over to Mr. Don Lindgren.

14 MR. LINDGREN: Okay. Once again, I am Don
15 Lindgren, AP1000 licensing. Just one or two -- this
16 is the first of the sessions on Chapter 3. We've got
17 -- they're broken down by NRC review branch. That
18 explains the order.

19 I wanted to go over what we have in
20 Chapter 3, because it is a fairly diverse chapter.
21 3.1 is the general design criteria. 3.2 is the
22 classifications -- 3.2 is the classifications of
23 structures, components, and systems. That is the
24 order in -- of the title in the DCD.

25 3.3 is wind and tornado loadings. Water

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1 level or flood design, which is what we are going to
2 be talking about this afternoon, is 3.4. 3.5 is
3 missile protection.

4 3.6 deals with the postulated effects of
5 -- dynamic effects of pipe rupture. That's 3.6. 3.7,
6 which we are not doing this session, is seismic
7 design. That would be done at a later session. 3.8,
8 which is design of Category 1 systems, also will be
9 done at a later session.

10 3.9 is titled "Mechanical Systems and
11 Components." It's also a fairly diverse section, so
12 we will be spending considerable time on that. 3.10
13 is seismic and dynamic qualification. And then, 3.11
14 is dynamic environmental qualification.

15 The slides cover all of those, so don't
16 throw them away when you leave today.

17 CHAIRMAN RAY: Okay. Very well.

18 MR. LINDGREN: Okay. Just to -- for
19 completeness, I wanted to -- we've got one slide on
20 3.1. There was not even a section in the SER on 3.1,
21 which is general design criteria. These were some
22 changes that were mostly due to conforming changes in
23 other sections.

24 We changed the name of the control support
25 area to technical support center. We changed -- the

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1 way we do main control room isolation changed, and
2 that showed up in the discussion of general design
3 criteria. And then, some of the sources of makeup
4 water for the spent fuel pool also showed up in 3.1.

5 There are no open items. In fact, there
6 isn't even a writeup in the SER on these, because
7 these changes are really discussed in other sections.

8 But just for completeness, we wanted to include that.

9 Okay. So we are talking about water level
10 or flooding, which is 3.4. And I am going to try
11 this. The first thing we have is a site plan. You
12 will find this table labeled in the DCD as security-
13 related. It is not. That's a mistake.

14 The rules are, if you can drive by it and
15 look at it, or in real terms bring it up in Google
16 Earth after it is built, then it is not security-
17 related. So this is not a sensitive picture.

18 Just for orientation, the building labeled
19 as Number 1 is the shield building and the
20 containment. The building labeled Number 4 is the
21 auxiliary building. Those two buildings together
22 comprise the nuclear island. They are on a common
23 basemat.

24 CHAIRMAN RAY: Is the containment really
25 oval like that?

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1 MR. LINDGREN: No, this is in effect the
2 fact that we've got a different screen orientation
3 here. And it stretches that picture.

4 CHAIRMAN RAY: Well, it also does the same
5 here.

6 MR. LINDGREN: Oh, it did it on this, too?

7 CHAIRMAN RAY: Yes. That's not quite as
8 bad.

9 MR. LINDGREN: This is my poor PowerPoint
10 skills. This is my poor PowerPoint skills, so all --
11 the ovals are all supposed to be circles.

12 CHAIRMAN RAY: All right.

13 MR. LINDGREN: But it's particularly worse
14 on --

15 CHAIRMAN RAY: So noted.

16 MR. LINDGREN: -- on the screen.

17 Okay. Seven is the rad waste building.
18 Three is the annex building. Two is the turbine
19 building.

20 A couple of things that are changed from
21 the certified design was the rad waste building was
22 made slightly longer in this direction. We call plant
23 north up here on the end -- the turbine end of the
24 building. So on what would be the west end of the aux
25 building, that grew some to put in the three monitor

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1 tanks.

2 We also extended the front of the rad
3 waste building over to connect to the annex building,
4 so that people don't have to go outside to get from
5 one place to the other. And then, from about the end
6 of the north end of the aux building, we added this
7 part of the annex building, which is basically office
8 space. And then, the turbine building grew a little
9 bit longer, not as long as this picture would
10 indicate.

11 Anyway, the purpose for this -- the real
12 purpose for putting this here is to address some of
13 the tanks we have. 13 and 14, which are up here by
14 the north end of the turbine building, those are fire
15 water tanks, and we do have a question about those.

16 17, which is next to the turbine here, is
17 the condensate storage tank. 25 is the passive
18 containment cooling ancillary water storage tank. It
19 supplies the water so that we have seven days' worth
20 of water onsite to address containment cooling. The
21 first three days are sitting in the tank on top of the
22 cooling chill building.

23 20 is a boric acid storage tank. 19 is
24 the demin water storage tank. The diesel oil tanks
25 are up here at level 18. This square -- rectangular

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1 building is the diesel buildings. And then, these
2 shapes labeled 15 are the transformers. We were
3 talking about unit auxiliary transformers and reserve
4 transformers. They are in this row here. And then,
5 five here, those are the service water cooling towers.

6 A couple of points to remember is this is
7 the -- I will be talking about the rail bay. It goes
8 here. It is actually in the aux building in line with
9 the railroad tracks here. In this area, just north of
10 the condensate storage building, there is an annex --
11 there is an access through the annex building and the
12 aux building to an equipment hatch.

13 And then, the actual access -- the
14 personnel access for most of the people to the aux
15 building is through the annex building, and that
16 doorway is up here. So the security is actually
17 inside the annex building.

18 MEMBER BONACA: I imagine building 4 has
19 further separation internally.

20 MR. LINDGREN: What's that?

21 MEMBER BONACA: Building 4 you must have
22 additional separation internally. Walls?

23 MR. LINDGREN: Building 4 is the auxiliary
24 building, and that has the reinforced concrete
25 building, reinforced concrete walls and ceilings.

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1 MEMBER BONACA: And roof.

2 MR. LINDGREN: And, yes, there is a --
3 about here there is a dividing wall between the north
4 side and the south side. The south side is the
5 radiologically contaminated part of the building. The
6 north side is the clean -- is the clean part of the
7 building. It's not -- it contains the batteries,
8 etcetera. And they are separated. There is no way to
9 get from one to the other without going through the
10 annex building.

11 MEMBER BONACA: Okay.

12 MR. LINDGREN: Okay? So some of those
13 points come up during the flooding story, so I wanted
14 to orient everyone there.

15 Okay. Go to the next one.

16 The changes we made that show up in 3.4,
17 the water level, we added parapets to the roof. This
18 is a plant protection issue, so previously we had a
19 flat roof with no parapets and the water just rolled
20 over the side, so we had to review our roof capability
21 of getting the water off the roof and the water -- the
22 rain load on the roof or the probable maximum
23 precipitation for that change.

24 We added some waterproofing options.
25 Waterproofing itself is not a safety-related

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1 consideration. But the friction between whatever you
2 are using for waterproofing, and the building, and the
3 soil is a safety-related consideration. And the
4 waterproofing choice is really a choice of the COL
5 applicant and their constructors and site conditions
6 and how -- also, it depends on how you are doing the
7 excavation.

8 So we added some choices, and we will end
9 up removing the one choice that we did have in there,
10 which was a cementitious choice that it turns out no
11 one is using. So the COL applicant has to define in
12 their application exactly what waterproofing they are
13 using.

14 MEMBER BLEY: When you worry about water
15 loading, which I think is the weight --

16 MR. LINDGREN: On the roof.

17 MEMBER BLEY: Yes. How do you look at,
18 you know, the spring when you might get a big load of
19 snow and then rain on top of the snow?

20 MR. LINDGREN: That is really a structural
21 question, and we can deal with that. That is a
22 consideration. It is -- actually, you have a snow
23 load, and then you rain on top of it, is the --

24 MEMBER BLEY: And that may plug all --
25 whatever drains you had.

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1 MR. LINDGREN: We have addressed that. I
2 don't have the answer here, but --

3 MEMBER BLEY: Okay.

4 MR. LINDGREN: -- we'll make sure that
5 when we do get to 3.8 we talk about that one.

6 MEMBER BLEY: Okay.

7 MR. LINDGREN: We added some watertight
8 doors down in the bowels of the auxiliary building.
9 That was for plant protection, strangely enough. It
10 wasn't for any kind of flooding story.

11 And then, we added three waste monitor
12 tanks to the rad waste building. The waste monitor
13 tanks are -- they are 15,000 gallons apiece.

14 We changed the volume of the fire water
15 tanks that I showed you on the north end of the
16 turbine building from 400,000 gallons to 490,000
17 gallons. This was based on some design finalization
18 of how much we need for fire, and I believe we also
19 have some contingency uses for that for things like
20 the tank on the roof and spent fuel pool cooling.

21 Okay. We changed the probable maximum
22 precipitation from 19.4 inches per hour to 20.7 inches
23 per hour. Wherever you are, if you are having this
24 much rain, you are getting a lot of rain. It is
25 really a 15-minute rate. I mean, you can -- at this

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1 rate, you have to deal with the load on the roof, that
2 you get this -- if you get it at this rate in 15
3 minutes.

4 So this was to bound a couple of
5 additional sites. It is not clear exactly how it
6 happened, but somehow people didn't look at Florida
7 when we -- they may have looked at Florida. It was
8 very confusing. We now include both Florida sites for
9 our maximum precipitation.

10 And the impact this has is the structural
11 loading on the roof for the AP1000 design.

12 The nominal grade elevation is what we
13 call "plant elevation 100." That's nominally the
14 front door and the like. We expect the actual grade
15 will be a couple of inches lower, a few inches lower
16 than that and slope away to direct surface water away.

17 The maximum water table elevation is 98
18 feet. That is the number that you come up with based
19 on historic groundwater testing and historic values.
20 There is no practical operational limit regarding --
21 related to that, because our seismic evaluation, and
22 the next one -- well, the maximum predicted flood
23 level is 100 feet.

24 You can't operate this plant with the
25 water lapping at the doors. There are no penetrations

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1 below that elevation that would let water in, and so
2 it can work at that level. Practically, people
3 probably wouldn't do that, but -- and we have also
4 analyzed -- the seismic analysis assumes water at that
5 level.

6 MEMBER BLEY: It's 100 feet from where?

7 MR. LINDGREN: No, plant elevation 100.

8 MEMBER BLEY: Okay.

9 MR. LINDGREN: Okay. So that's the
10 nominal elevation of the -- of most of the doors.

11 And there is no plus tolerance on this.
12 There is a -- there is a table in Tier 1 that has a
13 plus or minus three and a half feet on the grade
14 elevation. It turns out that that's related to the
15 seismic analysis and not to the flooding. Your
16 maximum flood level is 100 feet, is the plant
17 elevation 100 feet.

18 So a couple of things to note is that it
19 is -- the plant -- the elevation is plant elevation
20 100 at the rail -- the truck bay. It is 100 at the
21 entrance that gets you into the annex building, and
22 then to security on the north side of the annex
23 building.

24 But where you have access to the annex
25 building and aux building to the equipment hatch at

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1 containment, that is at the 107-foot level. So there
2 will most likely be a ramp or something there.

3 Okay. Open items.

4 MR. SISK: Any questions?

5 (No response.)

6 MR. LINDGREN: We have got -- we do have
7 an open item on the analysis of the use of the
8 parapets, considering the design for the probable
9 maximum precipitation. That analysis is complete.
10 That analysis had to be done to support the design
11 change in the first place, and we have a response in
12 preparation.

13 The next one is an analysis of an increase
14 in the fire tank volumes. Once again, that analysis
15 isn't complete, and the response is in preparation.

16 And then, the hydrodynamic loads of the
17 rad waste building, a response is in preparation.
18 This is actually a -- we have do a revision of an RAI
19 response. We apparently were not completely clear on
20 that. And "response in preparation" means that we
21 will probably be getting it to the staff in the next
22 two to three weeks. None of these are particularly
23 challenging.

24 That's what I have prepared on flood.

25 MR. SISK: Questions?

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1 CHAIRMAN RAY: I don't believe so. Is
2 that it, Rob?

3 MR. SISK: Yes, sir. That would be it for
4 the 3.4 today. We have got the other portions in your
5 handout we'll cover tomorrow.

6 MEMBER BONACA: One question I have is:
7 did the DCD have a water level flooding at outages
8 before? Or is it completely new?

9 MR. SISK: I'm sorry. I didn't hear.

10 MEMBER BONACA: I'm saying, did the
11 original design document contain also water level or
12 flooding analysis? Is this an improvement to it, or
13 was it missing completely from --

14 MR. LINDGREN: It was there. I just was
15 focused on the changes here, and giving you a little
16 background --

17 MEMBER BONACA: Okay. I'm not --

18 MR. LINDGREN: -- on the -- well, our
19 containment is designed to flood. That's the whole
20 passive safety story on that. And then, the -- in the
21 aux building, most everything drains to the first
22 floor. There are sump pumps there.

23 And in some cases it drains out to
24 adjacent buildings next to it. The adjacent buildings
25 never drain into the aux building.

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1 MR. SISK: In answer to your question, the
2 flood level was not a change. It's the other changes
3 that we were really focused on.

4 CHAIRMAN RAY: All right. Anything else
5 for the applicant?

6 (No response.)

7 If not, then we're ready for the staff's
8 comments on 3.4.

9 MS. CLARK: Okay. I'm Phyllis Clark,
10 Project Manager for Section 3.4, flood protection. I
11 work for Eileen McKenna, and today we are going to
12 review some of the changes for 3.4, flood protection.

13 The technical staff that will be
14 discussing the changes -- Kenneth See, Chang Li, and
15 Jerry Chuang.

16 Okay. The number of open items we have
17 for each section, specifically for 3.4.1.1, we have
18 two open items. That's in the protection from
19 external flooding. 3.4.1.2, protection for internal
20 flooding, zero open items. And 3.4.2, analysis
21 procedures, has one open item.

22 A brief summary for these particular
23 changes, under 3.4.1, we have the design parameters
24 change in Section 2.4 that is potentially affecting
25 the roof design. For 3.4.1.2, protection from

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1 internal flooding, we have the addition of three
2 wastes --

3 CHAIRMAN RAY: Oh, wait. Before you go
4 on --

5 MS. CLARK: Okay.

6 CHAIRMAN RAY: -- let's back up to the
7 first one you said.

8 MS. CLARK: Okay.

9 CHAIRMAN RAY: Design parameter change in
10 Section 2.4 potentially affecting the roof design.
11 That leads to an open item.

12 MS. CLARK: Right.

13 CHAIRMAN RAY: Okay. Can you share with
14 us anything about this design parameter change? I
15 realize we are not reviewing 2.4. We are going to get
16 to it. I see. You are only giving us a preview.
17 Excuse me.

18 MR. SEE: We are building the excitement
19 level.

20 MS. CLARK: Yes.

21 (Laughter.)

22 CHAIRMAN RAY: Okay. Well, we need that
23 at this time of day.

24 (Laughter.)

25 So forgive me.

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1 MS. CLARK: Okay. That's okay.

2 Okay. 3.4.1.2, discussion of internal
3 flooding. The addition of three waste monitor tanks
4 to the flooding analysis, and also we are discussing
5 the other flow structure changes.

6 And for 3.4.2, which Jerry will cover, is
7 an analysis of procedures. And those are changes
8 related to the external flooding events and their
9 impact on the structural integrity of the safety-
10 related building.

11 Now I'll turn it over to Kenneth See.

12 MR. SEE: Good afternoon. My name is
13 Kenneth See. I'm a Hydrologist in the Hydrologic
14 Engineering Branch in the Office of New Reactors.

15 I think Phyllis did a good job of
16 summarizing the open items. The first thing here has
17 to do with the change in their probable maximum
18 precipitation parameter from 19.4 to 20.7 inches per
19 hour. The staff is not questioning that value, but
20 given the design changes, the addition of the
21 parapets, we wanted to know the effect, you know, the
22 combination.

23 It wasn't clear to us at the time we wrote
24 this open item if there was actually a design change
25 to the roof, or there was just some insertion of

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1 additional text in the document. So given what I have
2 heard today, in the follow-on they have actually made
3 some changes. So that is -- that deals with the first
4 bullet.

5 And the second bullet deals with the
6 potential --

7 CHAIRMAN RAY: We have some of the same
8 problems, you know it? We see changes in the text,
9 and we don't know what to make of it. But I guess
10 that was the reaction you had, huh?

11 MR. SEE: Correct.

12 And the second one has to do with the
13 increase of the tank and the potential impact on any
14 safety-related or RTNSS-related structures. These
15 remain open. We haven't had any interactions with
16 them yet. Sounds like we've got a response coming,
17 and we'll get them on the phone when we get it in.

18 So short and sweet.

19 MEMBER BANERJEE: I guess I'm sort of
20 having the problem, why are these changes being made?

21 They seem very minor. What is the reason for them?
22 I mean, unless there is a rationale, it is hard for us
23 to get --

24 CHAIRMAN RAY: On rainfall, Sanjoy, he
25 said it was to accommodate --

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1 MR. SEE: There is an EPRI document,
2 utility requirements document, and I believe there is
3 a NUREG -- I think it's 1242, don't quote me on that,
4 even though the transcripts will -- where the staff
5 evaluated these parameters for reasonableness. And
6 the increase from 19.4 to 20.7 isn't a big enough
7 change really to, you know, cause us concern. If they
8 change it to 50 inches per hour, then that would
9 certainly raise red flags.

10 But, you know, buy into their argument for
11 bounding additional sites, we saw no reasonable --

12 MEMBER BANERJEE: Going from 400 to 490,
13 is that a big change? Gallons, tank --

14 PARTICIPANT: Twenty percent.

15 MR. SEE: Yes.

16 MEMBER BANERJEE: I mean, is it
17 significant? I mean, in some way, what we -- what I
18 am finding is that you've got message detail here.
19 It's hard to get your hands on what is significant and
20 what is not significant. And, you know, if it's not
21 really significant -- and the staff doesn't think so
22 -- then --

23 MR. SEE: The P&P -- GDC-2 requires us to
24 look at the P&P. And so if 20.7 is the bounding value
25 in lieu of 19.4, then they are indeed correct to make

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1 that change.

2 MEMBER BANERJEE: I am just wondering what
3 ACRS -- why we need to --

4 CHAIRMAN RAY: I don't know that they can
5 answer the question.

6 MEMBER BANERJEE: We need to, you know --
7 there are things that they don't know.

8 MR. SEE: I understand the question, but I
9 won't answer it. We all --

10 MEMBER BANERJEE: That's fine. There are
11 things we would like to focus on.

12 MR. CUMMINS: Ed Cummins. We can give our
13 opinion.

14 MEMBER BANERJEE: Yes.

15 (Laughter.)

16 CHAIRMAN RAY: I'm not asking for your
17 opinion.

18 (Laughter.)

19 We may decide to ask for your opinion, but
20 not yet. Okay?

21 (Laughter.)

22 MEMBER BANERJEE: All right. You let
23 the --

24 (Laughter.)

25 CHAIRMAN RAY: Where were we? Proceed,

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1 please. I'm just trying to keep this train running on
2 time, and so far I have done okay.

3 MR. SEE: I'm done. I'll turn it back to
4 Phyllis.

5 MS. CLARK: All right. So next we will
6 cover 3.4.1.2.

7 CHAIRMAN RAY: Okay. These are open
8 because you haven't reviewed them yet and signed off.
9 Is that it?

10 MR. SEE: Correct.

11 CHAIRMAN RAY: Okay.

12 MR. SEE: We have not received --

13 CHAIRMAN RAY: That I think partly answers
14 Sanjoy's question. They're just open because they
15 need to be noted as open, because you're not done.

16 MR. SEE: Right.

17 CHAIRMAN RAY: Okay. Onward.

18 MR. SEE: I was here because I was told to
19 come here and talk about this.

20 (Laughter.)

21 CHAIRMAN RAY: Okay. All right. Well,
22 after you hear about three or four days of this, you
23 begin to wonder if --

24 (Laughter.)

25 PARTICIPANT: We don't need to go through

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1 this list?

2 CHAIRMAN RAY: I don't know, frankly,
3 because we have -- as Sanjoy has pointed out more than
4 one, we don't yet have a way of not doing it. So
5 let's do it.

6 MR. LI: My name is Chang Li. I'm with
7 Balance-of-Plant Systems Branch. I reviewed
8 Section 3.4.1.2, internal flooding.

9 Showing the slide. Staff evaluated this
10 following changes that Westinghouse identified. And
11 we reviewed the proposed change and made a
12 determination for each change whether it could affect
13 existing SER. That's NUREG-1793. The SER's
14 conclusion related to internal flooding.

15 That is whether the safety-related systems
16 will be adequately protected from flood-related
17 effects associated with systems or component failures
18 in the plant -- in other words, when we look at each
19 item associated with the changes and look into whether
20 that would affect any safety-related system to perform
21 its function.

22 We found five of these eight changes might
23 affect the previous SER conclusion. We then followed
24 up to ask RAIs for those five changes, and we reviewed
25 all of the RAI responses and determined all RAIs have

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1 been satisfactorily addressed in Revision 17.
2 Therefore, we issued the SER with no open items.

3 CHAIRMAN RAY: Thank you.

4 MS. CLARK: All right. Next we have
5 Jerry. He is going to discuss analysis procedures in
6 3.4.2.

7 MR. CHUANG: Good afternoon. My name is
8 Jerry Chuang. I will be presenting the review of
9 3.4.2, the analysis procedure in the flood design.
10 This section deals with the methodology to transfer
11 the static and dynamic effects of the groundwater and
12 flood levels into the loads of the pressure applied to
13 the seismic Category 1 structures.

14 This methodology is reviewed in the
15 section, but will impact all chapters in 3.8,
16 containment design. There is no changes in the
17 methodology. In this section, which we track the --
18 you know, already approved in Revision 15.

19 Let's recall the design basis. The AP1000
20 flood level is designed up to the elevation 100 feet,
21 as described in the previous presentation. And the
22 groundwater level is 98 feet, which is two feet below
23 the grade level of the elevation 100 feet.

24 The open item relates to Technical
25 Report 116, namely the addition of the three new rad

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1 waste monitoring tank stability.

2 Here is -- the slide on the left is the
3 plain view of the rad waste building, and this is the
4 new addition of the three tanks. On the right-hand
5 side is the cross-sectional view of the same tank.

6 Now, the safety concern is that rad waste
7 building, for example, is non-seismic. Therefore, it
8 is permitted for -- due to extreme environmental
9 conditions, such as earthquake or tornado event. And,
10 furthermore, the location of this building is just
11 next to the nuclear island structure, such as
12 auxiliary building or containment building.

13 Now, the consequence of the collapse would
14 be, number one, increase flood level a number of feet;
15 and, secondly, to reduce the hydrodynamic load, as our
16 standard review plan dictated that if flood levels are
17 above the ground level again, hydrodynamic event must
18 be considered. This will impact on the loading
19 conditions of containment building and auxiliary
20 building.

21 So to address the open item issue, then
22 there is the whole rupture of this liquid waste
23 monitoring tanks, it will impact on the flood level,
24 and the design of the hydrodynamic loads on the
25 nuclear island structures.

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1 And Westinghouse were provided bounding
2 analysis and shielded uprates, the site-specific
3 conditions, which abide by the DCD criteria and the
4 bounding analysis results.

5 Thank you.

6 MEMBER BANERJEE: So, in this calculation,
7 is it just the load of the level, or do they take sort
8 of a wave into account which comes from --

9 MR. CHUANG: For example, the hydrostatic
10 loads were influenced by floatation --

11 MEMBER BANERJEE: Right.

12 MR. CHUANG: -- which is --

13 MEMBER BANERJEE: What about, is there any
14 dynamic load?

15 MR. CHUANG: Oh, yes. Yes, because the --

16 MEMBER BANERJEE: So you have sort of a
17 wave hitting the structure. Fine.

18 MEMBER BLEY: And since it's a non-seismic
19 building, could a seismic event cause this so you
20 would have the seismic excitation, too?

21 MR. CHUANG: Oh, yes, it's all -- both.

22 MEMBER BLEY: You look at that, too. They
23 looked at that.

24 MR. CHUANG: Yes, yes.

25 MEMBER BLEY: Okay.

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1 MR. LINDGREN: This is an open item.

2 MR. CHUANG: An open item.

3 CHAIRMAN RAY: They will get back to it.

4 MEMBER BANERJEE: So the addition of these
5 three tanks, what sort of percentage of the volume are
6 we talking about with this?

7 MR. CHUANG: We assume all, you know,
8 collapse. We should not assume because there is no
9 seismic, so the --

10 MEMBER BANERJEE: Right. But, I mean --

11 MR. CHUANG: So the whole volume of water
12 will flow.

13 MEMBER BANERJEE: Right. But what is the
14 percentage of the -- what can be ascribed to this?

15 MR. CHUANG: This three additional tanks
16 alone is about one foot additional, not --

17 MEMBER BANERJEE: Out of how many --

18 MR. CHUANG: On top of the -- yes. So it
19 would be above the grade level.

20 MEMBER BANERJEE: There is an existing --

21 MR. CHUANG: It was at the grade. Because
22 of this additional collapse was at one foot, and they
23 have some other -- fire, water tank, which is on top
24 of that.

25 MEMBER BANERJEE: So in the original

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1 certified design --

2 MR. CHUANG: Yes.

3 MEMBER BANERJEE: -- what was the flood
4 level? And how much does this --

5 MR. CHUANG: One hundred feet.

6 MEMBER BANERJEE: One hundred feet.

7 MR. CHUANG: Yes.

8 MEMBER BANERJEE: How much would this
9 cause?

10 MR. CHUANG: At least one feet. And if
11 you have fire or water tank on the other buildings
12 that were -- only a reasonable level.

13 MR. CUMMINS: This is Ed Cummins again.
14 The flood level of 100 is zero water level next to the
15 tank.

16 MR. CHUANG: Yes.

17 MR. CUMMINS: So that's grade, it's dirt.
18 And it's sloped away. So any water you get from the
19 tank, it might be a little flood -- a little water for
20 a very short period, because it is going to run away.

21 But it -- for the transient, it could have a wave,
22 and it could have some flood level.

23 MEMBER BANERJEE: If you didn't take the
24 wave into account, there would be just a one foot
25 level.

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1 MR. CUMMINS: There would be no permanent
2 level, because -- there is no permanent level, because
3 the water will run away. But there is a temporary
4 level.

5 MEMBER SHACK: What was the wave level,
6 for example, from the two 400,000-gallon fire water
7 tanks?

8 MR. CHUANG: We saw -- didn't consider
9 that yet.

10 MEMBER SHACK: Those are seismically
11 qualified.

12 MR. LINDGREN: Those are on the north end
13 of --

14 MEMBER SHACK: Okay.

15 MR. LINDGREN: Those have a --

16 MEMBER SHACK: Those don't get there.

17 MR. LINDGREN: Those have a turbine
18 building between --

19 MEMBER BANERJEE: So this is a new --

20 MR. LINDGREN: This is a new thing, then.

21 MR. CHUANG: Because the loading is two
22 parts -- hydrostatic, which is including groundwater
23 that is 14 feet, up 14 foot, up to the foundation.
24 You have hydrostatic ratio because of water.

25 MEMBER BANERJEE: But, I mean, what Ed was

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1 saying is that the water drains away, so there is not
2 a force which is there for any --

3 MR. CHUANG: Changing effect.

4 MEMBER BANERJEE: Yes. Dynamic effect is
5 primarily from the wave load, or is it from the --

6 MR. CHUANG: I don't know. That's too --
7 you need to analyze it. We don't have the
8 information.

9 MEMBER BANERJEE: Oh. So they are
10 going --

11 MR. CHUANG: They have committed to do it.

12 MR. LINDGREN: That is the open item.

13 MEMBER BANERJEE: Right. Okay. And how
14 are you doing this analysis, using some standard
15 surface code, or how are you -- is it a shallow water
16 calculation? I mean, that means we lost something,
17 which is interesting.

18 MR. CUMMINS: I mean, it will not be a
19 complicated analysis.

20 CHAIRMAN RAY: Anything else, sir?

21 MR. CHUANG: No.

22 CHAIRMAN RAY: Okay. Thank you very much.

23 MR. CHUANG: Thank you.

24 CHAIRMAN RAY: So this is an open item.

25 All right. Now, I've got a couple of

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1 things to do. First, let me see if there is any
2 member of the public -- Mike?

3 MR. LEE: I'm not aware of any requests.

4 CHAIRMAN RAY: All right.

5 MR. LEE: And are there any members in the
6 audience?

7 (No response.)

8 Nope.

9 CHAIRMAN RAY: Okay. Thank you.

10 All right. Let me go around the table and
11 capture the views that we may want to take note of of
12 the members before we adjourn. Bill?

13 MEMBER SHACK: I thought the discussion of
14 Chapter 18 was very good. Clearly, to me that was --
15 you know, we need to decide how we are going to do
16 this, and we need to spend less time on looking at,
17 you know, changes in the precipitation rate probably,
18 and yet we -- you know, we are going to look through
19 18 here, and yet we have never seen, for example,
20 those OSA task analyses.

21 So, you know, we ought to come back -- to
22 me, that would be the two things that I would see that
23 we would be focusing on here, really, are the -- when
24 they're eliminating DAC, those are things we really
25 didn't review when we did the certified design. And

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1 so when they go from DAC to ITAAC, you know, that
2 essentially opens -- you know, that's -- we have never
3 seen this before, really.

4 And those are the parts of the -- you
5 know, those are the things in the change of the DCD
6 that I would be most interested in is when they go.
7 And I assume that's going to be happening in Chapter 7
8 also.

9 MR. SISK: Partially.

10 MEMBER SHACK: Partially. So, but, you
11 know, whenever -- when those things go, then that's --
12 you know, that I think triggers a fuller review. I
13 have a hard time picturing exactly what impacts the
14 Chapter 15 events, but those also seem more
15 significant than I would have expected in a DCD
16 change.

17 But, you know, from just looking at these
18 things these days, I would have spent less time on
19 some of these other things, more time on Chapter 18,
20 and be ready to spend more time on Chapter 7, as soon
21 as we see how many of the DAC go and what the basis
22 for eliminating those DAC are.

23 CHAIRMAN RAY: Well, as I said, we have
24 not yet developed, but I think we will develop, a way
25 of sorting these things out. We need to have some

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1 experience to base our decision on how to do that on.

2 But the reason you chose Chapter 18 wasn't Chapter
3 18, but it was because they were satisfying DAC. That
4 is the important thing.

5 And we have talked about, in the past,
6 this same problem of when DAC are met, what is the
7 process by which people in this building, including
8 ourselves, get involved?

9 MEMBER SHACK: Well, I think there will be
10 a difference in the way, when DAC are met after you
11 have had a design certification, and you are meeting
12 them later, and in this case when you are revising the
13 design certification so that it doesn't depend on DAC.

14 CHAIRMAN RAY: Yes. Well, let me say it
15 this way. If you satisfy -- this is repeating back
16 what you said. If you satisfy DAC without a design
17 certification, without a DCA, that's still --

18 MEMBER SHACK: That's new process.

19 CHAIRMAN RAY: Right, yes. This now makes
20 -- obviates that problem, but draws attention to the
21 fact that maybe that's a more significant part of any
22 DCA than other things might be, is meeting design
23 acceptance criteria, what is called here sometimes
24 "design ITAAC" to clarify my thinking.

25 Anything else?

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1 (No response.)

2 Sanjoy?

3 MEMBER BANERJEE: Well, I don't know which
4 DACs I'm interested in, and which I am not. It
5 certainly would be -- if the DVI line was a DAC, and
6 comes ITAAC, that would be -- all I'm really
7 interested in right now is trying to understand what
8 is significant and what is not. I'm having a really
9 hard time grappling with that.

10 CHAIRMAN RAY: Well, I think doing that is
11 hard for all of us. Figuring out how to do it
12 systematically in the future is the main goal that
13 we --

14 MEMBER BANERJEE: Yes, if I --

15 CHAIRMAN RAY: -- who should do it, how
16 should it be done.

17 MEMBER BANERJEE: Yes. Somehow we have to
18 work out a process, which is a sort of filter. And
19 that really is an important aspect.

20 CHAIRMAN RAY: It is. We all have some
21 ideas about that, and I think that today's experience
22 helps us develop those ideas. And, as I say, I'm not
23 going to ask Ed, but at some point maybe I will, how
24 to do it better. But, nevertheless, I agree.

25 Anything else?

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1 (No response.)

2 Dennis?

3 MEMBER BLEY: Yes. I am going to
4 reiterate a little bit Bill's items. I think the
5 areas where there are substantive changes that we
6 could really get into -- and I think we owe getting
7 into -- are this human factors engineering. I have
8 not read all of the reports that are available, and I
9 need to get all of those and read them carefully, and
10 then have questions.

11 And I would like to see some detail coming
12 to us from those. The same thing with whatever
13 details are being added in digital I&C and in the PRA
14 changes. Now, I suspect we will have technical
15 topical reports on -- we know we have them for the
16 human factors engineering. I expect we will have them
17 for digital I&C.

18 For the PRA, I'm not sure what we will
19 have to look at, but I would sure like to see some
20 detail, either from a good, solid review back from the
21 audits that staff does, or, if there are some reports
22 that have been put together by Westinghouse, that we
23 get to look at that. These are areas that are really
24 important.

25 And I guess I'd say what we learn from

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1 looking in detail might inform our thinking on how DAC
2 need to be closed in their various forms. And I guess
3 I would -- if our staff could put together -- and I
4 ask this because I find it difficult going through
5 Tier 1 to find all of the DAC the way they are listed
6 in there, if we could put together a list of all of
7 the DAC out of the Tier 1 to look at, just excerpts
8 from the tables, that would be helpful.

9 MR. CUMMINS: I think I can summarize
10 quickly. The DAC we have on AP1000 are three DAC.
11 One DAC is the DAC we talked about in human factors
12 today. There is a DAC on piping analysis, which we
13 will talk about tomorrow. And there is a DAC on I&C,
14 which really has -- in two sections.

15 There is a DAC on the -- I'll call it the
16 detail design of a protection system that provides the
17 trip and the ESF AC functions. And there is a
18 separate one that we usually include as part of that
19 same DAC on the DAS, the diverse actuation system,
20 detail design. So you might say there is four DAC,
21 but we usually count the two I&C ones together as one.

22 MEMBER BLEY: I guess what I meant was the
23 list of specific acceptance criteria for each of
24 those, so we can look at those as we look at the
25 details that we see here.

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1 CHAIRMAN RAY: Is there any reason why you
2 said the DAC for Tier 1 only?

3 MR. CUMMINS: All ITAAC are Tier 1, and so
4 this is basically -- I think it's the staff way back
5 when saying, "This is essential to my assessment of
6 the safety of the plant. And so if you don't have
7 design there, then I want a commitment that I can see
8 the design in a way that I can approve it or not
9 approve it." That's my perception of what -- why do
10 you get in Tier 1? You get in Tier 1 because it's
11 important to safety.

12 CHAIRMAN RAY: Anything else, Dennis?

13 MEMBER SHACK: I think there is actually a
14 table of those in 3.1.

15 MEMBER BLEY: Is there a single table?

16 MEMBER SHACK: Yes, AP1000 is --

17 MEMBER BLEY: I thought I found them
18 scattered.

19 MEMBER SHACK: You're thinking about the
20 other competing reactor that we --

21 MEMBER BLEY: Thank you.

22 (Laughter.)

23 I get mixed up occasionally on those.

24 I guess the last thing I -- the only thing
25 I would say, I don't think I said it, I am very

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1 pleased to see an applicant and their clients come
2 forward and trying to close all of these in the
3 certification amendment. I think that is -- it
4 certainly makes everything cleaner and is more in the
5 spirit of what we -- some of us thought Part 52 was
6 all about.

7 MEMBER SHACK: Harold, if I can just get
8 one -- one additional thing I think that would be a
9 flag is any time that the COL holder was supposed to
10 do something, and now that is being done in the DCD,
11 again, that is something that we have never looked at.

12 It at least should be flagged, and we have to
13 consider whether it's significant or not significant.

14 But it's certainly -- again, it's like a DAC. We've
15 really never looked at it before.

16 CHAIRMAN RAY: So it would be in the COL
17 -- well, you said it's something they were supposed to
18 have done, and now it's being done on the DCD. An
19 example from today?

20 MEMBER SHACK: Well, the Chapter 18 is
21 full of them. But I -- you know, what I worry about
22 is that there are others buried elsewhere that I don't
23 know as much about. But that would seem -- you know,
24 if I was looking for criteria, you know, my number 1
25 one is when the DAC disappear, and number 2 would be

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1 when a COL holder item suddenly gets subsumed, because
2 those are, again, items that we haven't reviewed at
3 all previously.

4 MS. MCKENNA: I think we have tried to
5 point those out in our presentations on them, and they
6 are marked in the DCD. You know, there's places where
7 the COL information items appear at the end of each
8 section. So if that section kind of disappears, goes
9 blank, then -- and there is a summary table of --

10 MEMBER SHACK: Yes. I mean, I was sitting
11 there with my -- I have Rev 11 rather than Rev 15, so
12 I sit here with Rev 11 and Rev 17 trying to figure out
13 exactly how they changed, and I could sort of see
14 those things. But it is -- you know, it is kind of a
15 tedious process.

16 MR. CUMMINS: So maybe I can help here,
17 too. Why do we have -- why did we have COL items? I
18 mean, we had COL items because we didn't have enough
19 money or enough time to do the design activities at
20 the time of the certification and/or it really wasn't
21 in the design scope. It was in the customer's
22 processes or the site-specific things.

23 So if you went back to the certified
24 design Rev 15 -- I don't remember the numbers exactly
25 -- there are 120 COL items. About half of them are

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1 design-related. And Westinghouse said to ourselves,
2 "We are going to close all of these design-related
3 ones ourselves as part of the revision to the
4 certified design. And we are going to leave over to
5 the COL those things that are applicable to their site
6 or to their processes and procedures."

7 So that's what we have tried to do, and so
8 there will be in almost every chapter some bit of COL
9 open items that we have addressed, and some that we
10 have not addressed.

11 MR. SISK: One other item to throw into
12 that is, of course, the standardization by closing
13 them out. It helps in standardization. But somebody
14 had asked for an example. We had Chapter 14. Talks
15 about the startup administration manual. We try to
16 close that out as a standard item for all plants, but
17 yet, by staff position, each site has to submit the
18 start-up administration manual.

19 So we can only go -- I think somebody made
20 the comment before, we can only go 90 percent, but
21 there has to be a COL information item to take to the
22 other 10 percent. So that would be a classic example
23 of where, obviously, there are holder items -- or,
24 excuse me, information items that the applicants
25 ultimately would have to deliver at some point in

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1 time.

2 MR. LINDGREN: And you will see more
3 examples tomorrow of where we have closed COL
4 information items, and identified them as such in our
5 presentations.

6 CHAIRMAN RAY: Let me move to Mr. Bonaca.

7 MEMBER BONACA: Yes. Well, I echo the
8 issue of DAC ITAAC. I mean, it's an issue we wrote a
9 letter about. It's significant I think in general,
10 and I think we will be working with the NRC staff to
11 get closure.

12 I missed the July meeting, as you know.
13 So, for me, this is the first one in which I was
14 involved in reviewing the application changes and the
15 SERs. And I must say that, you know, I got a sense
16 there has to be a better way for us to review this
17 material. I mean, you know, I spent a lot of time
18 going back from document to document and trying to
19 make sense of it, and finding a lot of the changes
20 were insignificant.

21 Certainly, in the presentation today I
22 found one way in which this information is congealed
23 so much more effectively. And I think we will need to
24 talk about in ACRS in general, on how we can improve
25 our review process by doing it differently from what

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1 we do. And we -- there is already a proposal on the
2 table to have a mini-retreat to discuss on how we
3 could do this better.

4 That's it.

5 CHAIRMAN RAY: All right. Mike?

6 MEMBER RYAN: Nothing else to add to that.

7 CHAIRMAN RAY: Tom, do you have anything
8 to say at this point?

9 DR. KRESS: Well, I am certainly glad to
10 hear these comments about searching for a better way
11 to review these things. I think going through it this
12 first time, I believe it is probably worthwhile. But
13 there are a few things that I think -- looking for
14 criteria on what to review and how to review it, it's
15 probably a good idea for some sort of retreat. I like
16 Mario Bonaca's suggestion there.

17 You know, we may look for things that are
18 significant, and maybe has safety implications, if
19 any. But we need to figure out a better way, because
20 a lot of this time is spent on things that are, in my
21 view, not significant.

22 About today's meeting, I think, once
23 again, both the staff and Westinghouse have done a
24 reasonably good job of -- you know, I like what they
25 say, and they have to put to bed a lot of things.

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1 The one thing that I think we need to look
2 a little more at, which might have some safety
3 implications, is the issue of the flowskirt. And I
4 think we have plans to look at that and how it's
5 handled in the calculations, the CFD code
6 calculations.

7 And one of my issues previously was the
8 issue of zinc injection. I think we've pretty well
9 handled that. I still don't know how you decide
10 whether it has any effect on projects, but probably
11 not much.

12 I'm good with what Harold Ray said about
13 keeping an update to the change matrix. It might be a
14 good way to follow those things and track the changes.

15
16 And I really appreciated the staff and
17 Westinghouse's trying to reply to Mario Bonaca's
18 question about giving us the -- what was the
19 motivation or the driving force behind these changes?

20 I thought that helped a lot. So that might be
21 another thing to put on your retreat list.

22 I like the new overspeed protection that
23 we heard about. It looks like it's both redundant and
24 maybe even diverse. I still think we have to check
25 that system at the overspeed conditions at the sensor

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1 level, and I think maybe put it on a turbine and
2 overspeed the turbine. We could do it offline
3 somewhere to show that it actually works in overspeed
4 conditions.

5 And I didn't really understand or see that
6 the change to 250 volts from the 125 volts might not
7 have an effect on the flow characteristics. I didn't
8 know where that shows up, but it was probably in
9 there, I just couldn't find it. That may have some
10 safety implications, if it does.

11 MR. CUMMINS: Sir, if I might address
12 that. Ed Cummins. There is no pumps. There are no
13 DC in our passive safety systems. There are motor-
14 operated valves that we operate, and there is no pumps
15 that are powered on DC power.

16 DR. KRESS: Thank you. I guess that takes
17 care of that.

18 You know, I was -- speaking of pumps, I
19 was somewhat startled to hear that the reactor coolant
20 pump flywheel inertia had to be increased because they
21 didn't have the correct values of the friction flow.
22 I don't know how we missed that, but that was a little
23 bit startling. You know, that's just a comment. I'm
24 sure you caught it. But it seems like it's something
25 the ACRS should have caught.

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1 CHAIRMAN RAY: Okay. And this is your
2 watch, Tom.

3 (Laughter.)

4 All right. Well, I seem to have -- you
5 know, we are learning. This is a learning experience
6 for everybody. The role of the ACRS is not the same
7 as the staff. Therefore, we can have a different way
8 of approaching something like this than simply
9 tracking with the staff, at least in principle. We
10 are going to be talking about it.

11 One of the things, though, that I think,
12 at least as Chairman of the Subcommittee, I have to
13 worry about is the overall workload and getting the
14 work done that needs to be done, however you define
15 that to be.

16 And one of the things that has to happen,
17 as well as the things that have been talked about
18 here, is a better way of getting information to the
19 ACRS so that it can manage its resources and do what
20 it needs to do.

21 And simply figuring out what is important
22 and what is not is not the solution to that problem,
23 because it -- as in the case of Mike Ryan here, there
24 are individual members who need to be lined up with
25 the topics to be discussed, and it does seem to me,

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1 just to mention something that hasn't been touched on
2 yet in this summary, that we are confronted with a
3 great need to get things done, but we are not sure
4 which things are going to be ready to get done next
5 time we meet.

6 And the agenda changes, the things that we
7 look at and talk about aren't the ones that we
8 necessarily expected to talk about, because those
9 aren't ready, and others ones are ready, so we'll do
10 them.

11 So there is a need for us to figure out a
12 way to be as efficient as possible, so that the end
13 result, which is that all of us get our jobs done as
14 close to expectations as possible, would be better
15 facilitated.

16 And you saw us having to go back on
17 issues. That is never very satisfying, because you
18 can't really be as confident that you are identifying
19 the things you need to revisit when you go about it
20 that way.

21 So, in any event, like I say, it isn't
22 just a matter in my mind of sorting out the important
23 stuff from the unimportant stuff, not even clear who
24 can do that for us. But it is also a matter of being
25 able to schedule the stuff to be done in a way that

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1 will allow us to do what we need to do as quickly and
2 efficiently as we possibly can.

3 Those are all the thoughts that are on
4 each of our respective minds. You have heard mention
5 made of the fact that we are going to talk about this,
6 and this is good experience. This is not something,
7 in my opinion, that is bad that has happened, but,
8 rather, it is something we needed to do and now we
9 need to learn from that and decide how to go forward
10 in the future and be as effective as we can.

11 We appreciate the cooperation of the
12 applicant here to help us get through this. And, Ed,
13 probably tomorrow I will ask for your suggestions,
14 since you certainly have a point of view that might
15 help us see a way to do this job more efficiently.

16 MR. CUMMINS: Would you mind if I make one
17 comment on your just recently going around the table?

18 CHAIRMAN RAY: No, I don't mind.

19 MR. CUMMINS: So I -- having read all of
20 these human factors technical reports, I believe you
21 will find them extremely frustrating, because they
22 don't really tell you what we are doing. They tell
23 you -- it's about process more than it is about the
24 design of the human interface.

25 And if it were me, I would -- the best way

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1 to get a feeling of whether you think that the AP1000
2 control room, which is the primary human interface, is
3 acceptable is to come visit the control room and see
4 how it works. And I think that if you are interested
5 in the process of human factors, then these reports
6 are -- describe the process of how you take steps in
7 the process. If you're interested in the result of
8 the process, which I think I would be more interested
9 in, then maybe we would want to schedule a visit to --

10 MEMBER BANERJEE: We did, didn't we?

11 MR. SISK: We did.

12 MR. CUMMINS: We did, but I don't know
13 that everybody --

14 MEMBER BANERJEE: Maybe not everybody.

15 CHAIRMAN RAY: Well, again, that is a
16 perfect example, Ed. We just didn't have the ability
17 to schedule everybody who had an interest in it. It
18 was done on short notice, and so on. But in any
19 event. Mario?

20 MEMBER BONACA: I would just give you a
21 sense of the impressions one gets getting his feet
22 into the process. I always believed, you know, from
23 what I have been reading before that Tier 1 is in the
24 untouchable. You can't touch it. I mean, that's it,
25 you know?

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1 Tier 2 you can change, but, you know,
2 still, you have to be -- and then, I get this package
3 and I'm beginning to look at it. And these are all of
4 the Tier 1 changes. So now I'm convinced I was wrong
5 in my impression, but the fact is I have got -- I'm
6 flaunting my ignorance I guess in saying that then
7 they are not untouchable. I mean, here they are.

8 They're all -- so there is a lot of
9 information that comes through, although it's not
10 specifically about a system or a component or
11 whatever, but about the whole process. That, you
12 know, for me it was a learning process, I mean, this
13 amendment or whatever -- Revision 17 -- changes would
14 be so extensive.

15 MR. CUMMINS: Yes. I think in an
16 amendment process changes to Tier 1 are not so
17 difficult or not so sacrosanct, but it's because in
18 the end it all gets returned into a rule. So it is
19 true that if somebody has a certified design, changes
20 to Tier 1 is very, very significant. But if you are
21 where we are, then you have to take advantage of the
22 time when you are changing the whole DCD to make any
23 changes that you would want to in Tier 1.

24 And so we don't -- we do put some higher
25 level of sensitivity to it, but we do have a lot of

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1 changes in Tier 1 when you take the whole thing.

2 MEMBER BONACA: Yes. I mentioned this
3 purely to give you a sense of, you know, what takes
4 place for people that have not been doing the review
5 in detail as part of the staff.

6 MR. CUMMINS: So.

7 MEMBER BONACA: So anything about context,
8 for example, why are you doing this change? It's very
9 important, because it tells me why you are doing it,
10 and it tells me that, for example, there is a real
11 basis for doing it now and not simply that we approved
12 before the DCD that it was incomplete.

13 This is the thought that I had reviewing
14 it. Did they miss the boat on this one? Or you
15 didn't probably, but I was left with that question.

16 MR. CUMMINS: Yes. That is maybe
17 something that we can think about to make it clear
18 where we did changes. For example, today I believe we
19 missed -- we talked about a couple of changes where
20 the design finalization made us figure out that we
21 missed the boat. I'll gather the two that I think of
22 today.

23 The battery that is supposed to supply the
24 lube oil reserve pump is too far away from it and too
25 low a voltage, and it wouldn't work. So we had to

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1 create a new battery.

2 And the other one is the 250 volt --
3 really, the cable sizing, when you try to hook the
4 cables to either the motor of the motor-operated valve
5 or the containment penetration, you have to change its
6 size five times before you get to -- I mean, it's
7 really ugly how you have to do big cables when you
8 have a small load because of voltage drop. And so we
9 didn't do that.

10 We hadn't done, I'll say, enough good
11 engineering at the time of the DCD to do -- most of
12 the other ones today, I think all of the other ones, I
13 would say was customer request. It's a little bit
14 better. It is -- there is no penalty in changing now.

15 It is -- so it's not really --

16 CHAIRMAN RAY: Well, okay. But
17 presumably, having taken this step, this would
18 probably be -- there would not be another round like
19 this, one would imagine, in the future. Right?

20 MR. CUMMINS: Right.

21 (Laughter.)

22 CHAIRMAN RAY: And I'm sometimes sorry we
23 do this round, but --

24 (Laughter.)

25 Having built a couple of plants, I would

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1 say that at least, in retrospect, this is predictable.

2 But maybe the process ought to have anticipated it
3 more than it did, because we find ourselves here in a
4 situation where, like I said in my comments, I'm not
5 sure I can see how to get it -- the job done that we
6 need to get done.

7 Now, obviously, we are trying to figure
8 out how to change the job that we need to get done, so
9 that we can get it done. But the upshot of it is in
10 one sense it is much easier to go through the thing
11 the first thing, because you are going through it
12 chapter by chapter, and there aren't things happening
13 simultaneously that affect multiple chapters, and so
14 on and so forth.

15 And by the way, let me say you did provide
16 in this change matrix a reason for change statement,
17 but it was like three or four words. You know, I
18 mean, it's -- so it's not like there was no reason for
19 the change given. It's just the reason wasn't very
20 good in most cases.

21 In any event, maybe this ought to be
22 viewed as a normal consequence of just getting a new
23 design to the marketplace and building the first
24 plant. You certainly wouldn't expect to do this
25 another time, I would think.

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1 MR. CUMMINS: No, you wouldn't, especially
2 after you have learned --

3 CHAIRMAN RAY: Like you said, I think it's
4 predictable that what we are looking at here would
5 have occurred. You need something to sell. And then,
6 once you've sold it, you need to finish the design to
7 the buyer's/customer's requirements, and that's just
8 the way it's going to be, in my judgment.

9 But that's enough philosophy. We are past
10 time. We've got another day to go.

11 Dennis?

12 MEMBER BLEY: Yes, I've got a funny
13 procedural question, I guess because it's a rule.
14 Now, when this certification is done on Rev 17, Rev 16
15 is still a certified design, right?

16 MR. SISK: Rev 16 is not a certified --

17 MEMBER BLEY: Not that you have to build
18 one, but there is a rule that says that one is
19 certified.

20 MS. McKENNA: The answer is it depends. I
21 think right now what is certified is Rev 15.

22 CHAIRMAN RAY: The amendment.

23 MS. McKENNA: The intention is we would
24 amend 15 and there would become a new -- and I will
25 just call it 18 for --

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1 CHAIRMAN RAY: Yes.

2 MS. McKENNA: -- so it would be one rule,
3 one design, and that would be one.

4 MEMBER BLEY: Good.

5 MS. McKENNA: Yes.

6 (Laughter.)

7 CHAIRMAN RAY: Okay. Sanjoy?

8 MR. CUMMINS: One comment. We started
9 this whole thought process by saying we have these 60
10 COL items that are design-related, and we have these
11 DACs, and they are design-related, and there would be
12 a big benefit to standardization and a big risk
13 reduction for our customers if we eliminated these.

14 And we do have customers. I mean, this is
15 -- and maybe the attitude of illuminating their risks
16 helps them be comfortable with us. We don't have that
17 -- we could ask them, but --

18 CHAIRMAN RAY: We're not going to.

19 (Laughter.)

20 My point -- look, Ed, this is a
21 predictable event.

22 MR. CUMMINS: Yes.

23 CHAIRMAN RAY: You need something to sell,
24 and once sold it -- once you've sold it, you need then
25 to reflect the customers' best interest in the design.

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1 This is I think predictable.

2 I just don't know that we have allowed
3 enough space for it to happen. That's the problem.

4 Yes, Sanjoy.

5 MEMBER BANERJEE: I wanted to ask you a
6 question related to the last certification. It is
7 more a question to inform us about our process. So
8 you had the AP600 certified, and you have mentioned
9 about the AP1000. The process was somewhat different,
10 if I recall. It wasn't the way we are doing it today.

11 What do you think -- I mean, maybe this is
12 a question you don't want to answer, but it was done
13 differently. You know, I remember that all of the
14 thermal hydraulic stuff was done by the Thermal
15 Hydraulics Committee. You know, things just went and
16 happened as they would naturally happen, whereas here
17 you have a bunch of people who are sitting through,
18 you know, the minutiae of things that they are not
19 really experts at.

20 So I'm wondering which was a more
21 efficient -- which do you think would be a more
22 efficient process?

23 MR. CUMMINS: I think that's hard for me
24 to say. You're asking me about the efficiency of your
25 process before I'm --

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1 MEMBER BANERJEE: Yes. How efficient was
2 it the last time around?

3 MR. CUMMINS: I think it was efficient.

4 MEMBER BANERJEE: Yes. My impression, it
5 was pretty efficient.

6 CHAIRMAN RAY: But, Sanjoy, when you say
7 "it," I've got to make an observation. I think it's
8 -- it was different then than the "it" is now.

9 MEMBER BANERJEE: How?

10 CHAIRMAN RAY: Well, I believe what we are
11 looking at are a large number, by my count well over
12 600 at this point, changes. You weren't looking at
13 changes before. You were looking at topics. And
14 that's -- if we can get the changes burned into
15 topics, then -- and that's what I was talking about at
16 lunch, if we could identify the changes into
17 discernible, identifiable, technical changes -- the
18 way I would think of them -- then it's very much like
19 what was done the first time. You are reviewing
20 thermal hydraulics.

21 But in this case they are so --

22 MEMBER BANERJEE: It's not a philosophical
23 discussion here. This is a practical thing. I mean,
24 we are doing the same thing, which they are involved
25 with so perhaps it's of no question to them, but we

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1 are doing it for all of the other reactors the same
2 way. And I think it just is not the right way to do
3 it.

4 CHAIRMAN RAY: And we are going to take
5 that question up for --

6 MEMBER SHACK: Actually, you are
7 historically wrong. That's a different question.

8 CHAIRMAN RAY: All right. Enough. We are
9 actually in public here.

10 All right. With that, we will see you at
11 8:30 in the morning.

12 (Whereupon, at 4:05 p.m., the proceedings in the
13 foregoing matter were adjourned, to
14 reconvene at 8:30 a.m., the following
15 day.)

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