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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)

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7 SUBCOMMITTEE ON THE WESTINGHOUSE AP1000 DESIGN

8 CONTROL DOCUMENT AMENDMENTS AND

9 NRC DRAFT SAFETY EVALUATION REPORT WITH OPEN ITEMS

10 + + + + +

11 WEDNESDAY, OCTOBER 7, 2009

12 + + + + +

13 ROCKVILLE, MARYLAND

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

18 SUBCOMMITTEE MEMBERS:

19 HAROLD RAY, Chair

20 J. SAM ARMIJO, Member

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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1 CONSULTANT TO THE SUBCOMMITTEE:

2 THOMAS S. KRESS

3  
4 NRC STAFF PRESENT:

5 MICHAEL LEE, Designated Federal Official

6 WEIDONG WANG

7 EILEEN McKENNA

8 ROBERT HSU

9 CHENG WU

10 SHANLAI LU

11 JENNIFER DIXON-HERRITY

12 PEI-YING CHEN

13 RICHARD McNALLY

14 RENEE LI

15 TERRI SPICHER

16 PHYLLIS CLARK

17 TUAN LE

18 JERRY CHUANG

19 TOM SCARBROUGH

20 ERIC REICHEL

21 OM CHOPRA

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ALSO PRESENT:

ROB SISK

DON LINDGREN

ED CUMMINS

PHIL KOTWICKI

DALE WISEMAN

GREG MEYER

MANO SUBUDHI

MARK DEMAGLIO (via telephone)

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C-O-N-T-E-N-T-S

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

(8:28 a.m.)

OPENING REMARKS BY THE SUBCOMMITTEE CHAIR

CHAIR RAY: We'll come to order and go on the record.

This is the second day of the meeting of the AP1000 Reactor Subcommittee, a standing subcommittee of the Advisory Committee on Reactor Safeguards, or ACRS. I'm Harold Ray, chairman of the subcommittee.

Other ACRS members in attendance today are Sam Armijo, welcome Sam. Sanjoy Banerjee, Dennis Bley, Marty Bonaca, Bill Shack and Michael Ryan.

Tom Kress, an emeritus of the ACRS and former committee chairman, is also seated here at the table with us today, and he is an invited consultant to the subcommittee.

Michael Lee is the ACRS and is the designated federal official for this meeting. He is joined by Weidong Wang, also of the ACRS staff.

The rules for participation at today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register. I believe we received no written comments or requests to make oral statements from interested

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1 members of the public regarding the subject of today's  
2 meeting.

3 I understand that we have a speaker phone  
4 in operation today, and we ask those individuals  
5 participating in this subcommittee meeting over the  
6 telephone bridge line to place their speaker phones on  
7 mute.

8 As stated in our earlier Federal Register  
9 Notice, the transcript of the meeting is being  
10 prepared and will be made publicly available in the  
11 near future on the ACRS website. Therefore, we  
12 request that anyone wishing to address the  
13 subcommittee on the record use one of the microphones  
14 located throughout the meeting room. We have worked  
15 to trim those up from yesterday's operation, and we'll  
16 see how they do today.

17 We request that you first identify  
18 yourself and your affiliation and speak with  
19 sufficient clarity and volume so that your comments  
20 may be readily heard and recorded. We also request  
21 that if you are in possession of cell phones or some  
22 kind of electronic paging device, you adjust it to  
23 silent mode or alternatively turn it off so as to not  
24 interrupt the conduct of the meeting.

25 All that having been said, our meeting

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1 agenda continues from yesterday, and we intend to  
2 proceed as published. Let me first ask Eileen if the  
3 staff has any comments.

4 MS. MCKENNA: No. I think we are ready  
5 to proceed.

6 CHAIR RAY: All right. Then as  
7 scheduled, we will begin, Rob, with - we have a set of  
8 agenda items, or Chapter 3 Sections. You will  
9 announce them in turn, and proceed. And we will just  
10 proceed right in.

11 MR. SISK: There are some extra black and  
12 white copies.

13 (Off the record comments.)

14 DCDA CHAPTER 3 SECTIONS 3.2, 3.6, 3.9.1-3.9.5,  
15 3.10, 3.12

16 MR. SISK: Okay, we are going to proceed  
17 then into Section 3.2 the classification of  
18 structures, and once again I'll turn it over to Mr.  
19 Don Lindgren.

20 MR. LINDGREN: As we said we are picking  
21 up from where we left off yesterday in the package,  
22 and we are following the division of these. It turns  
23 out it's by branch, review branch.

24 The classification Section 3.2 of Chapter  
25 3, the changes we made are primarily to the equipment

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1 classification table. It's a table of about 65 pages  
2 long that identifies the equipment classification, and  
3 the - and generally the industry code to which it is  
4 built for all of the safety class equipment and much  
5 of the other equipment.

6 The reasons for the changes were some  
7 related design finalizations. That typically is, add  
8 a valve here, take a valve off there. We had RAI  
9 responses to NRC questions that required additions and  
10 deletions and changes to the table.

11 Of most interest we added ancillary  
12 diesels. The diesels that sit in the annex building  
13 and supply backup power to the batteries among other  
14 things. They are not the large diesels that sit in  
15 the diesel generating building.

16 We added fire protection equipment, and we  
17 corrected the hydrogen control equipment  
18 classification consistent with what the industry is  
19 going.

20 We also had some changes related to what  
21 we were doing with the envelope in the control room.

22 There are some additional updates to the  
23 table required due to RAI responses once again, and  
24 also an NRC audit, and our review of what they found  
25 in that audit.

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1 CHAIR RAY: Those are the facts. Are we  
2 going to at some later time, or at the appropriate  
3 point, talk about the reasons for the more significant  
4 of those changes?

5 MR. LINDGREN: Primarily it's RAI  
6 response to the request - in response to the NRC  
7 requests.

8 CHAIR RAY: let's take the - from our  
9 standpoint, we have a certified design now. It's  
10 being amended. For example take the diesel  
11 generators. They were added for some reason other  
12 than just to respond to an RAI, I'm sure. Would  
13 somebody elaborate on that please?

14 MR. LINDGREN: They are used as backup to  
15 provide additional power to the batteries and the pump  
16 that recirculates water through the passive  
17 containment cooling water storage tank. We had not  
18 put them on the table, and the NRC thought we should,  
19 and we agreed.

20 MR. CUMMINS: This is Ed Cummins. We did  
21 not add the diesels after the certify was done. The  
22 diesels were added in the design prior to design  
23 certification. But we omitted including those diesels  
24 in this classification paper, and we basically agreed  
25 with the staff that that omission should be corrected,

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1 and that we should provide a classification.

2 CHAIR RAY: Thank you, Ed. That's a lot  
3 more insight than what was said up to that point.

4 So the design didn't change, but the  
5 classification?

6 MR. CUMMINS: Nothing really changed  
7 other than we inserted information in the DCD which  
8 was not in the DCDs before. That is we recorded the  
9 diesels and their classification in the table.

10 MEMBER SHACK: But you did change the  
11 building classification, the annex building, the  
12 uniform building code seismic two?

13 MR. CUMMINS: That was in the certified  
14 design. We did that before.

15 MR. LINDGREN: And the next page, the  
16 next slide addresses that. Oh, you got it? Okay.

17 We did make some minor changes to the  
18 structure seismic classification. The NS structures  
19 or non-seismic structures, many of them do have  
20 seismic requirements; they are just not category one  
21 or category two; typical building code. That was  
22 explained much better in Section 3.7 than it was in  
23 3.2, so we added a reference to Section 3.7 to define  
24 what seismic classifications were.

25 We made some changes to the annex

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1 building. The annex building, portions are seismic  
2 category two, portions are NS, and we moved a wall  
3 that divides the two of them, and we added more  
4 building in the seismic category NS.

5 The most significant change was the first  
6 bay of the turbine building previously was NS. We  
7 have made it seismic category two. The first bay of  
8 the turbine building is now a reinforced structure.  
9 Previously it was a lightweight construction, so that  
10 it would - if it fell into the aux building, it  
11 wouldn't damage the aux building.

12 We have as I said, we have made it a  
13 reinforced concrete building. We have made it larger.

14 We have put heavy equipment in there, so it is not  
15 seismic category two.

16 The change in the seismic requirements  
17 pointing it at 3.7 is really to clarify the  
18 requirements - it was in response to an RAI request.  
19 The changes to the annex building were largely in  
20 response to customer requests. The change to a  
21 reinforced concrete building is a plant protection  
22 feature.

23 The - and as we beefed up that first bay,  
24 it could no longer be classified - we also corrected  
25 the fire protection classifications, the fire

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1 protection equipment inside the containment, to  
2 seismic requirements. That wasn't reflected before,  
3 and that is on the nature of a correction.

4 Questions were raised by the staff during  
5 the review about the classification and requirements  
6 for regulatory treatment of non-safety systems and  
7 defense in depth type systems. We have not changed  
8 the classification criteria definitions and  
9 requirements that were certified in the DCD and 3.2  
10 AP1000 relies on safety-related systems to shut down  
11 the plant and mitigate postulated accidents.

12 RTNSS and defense in depth systems provide  
13 investment protection, and they are not required to  
14 support the operation of safety-related systems.

15 RTNSS is including Class D in section 3.2.

16 You won't find the term used in this section, won't  
17 find it used much in the DCD.

18 These next couple of bullets are copied  
19 out of the DCD, so that you understand what this  
20 equipment does and how we classify it. A structural  
21 system or component is classified V when it directly  
22 acts to prevent unnecessary actuation of the passive  
23 systems, structure systems and components, both those  
24 which directly act to prevent the actuation of a  
25 passive safety system are also Class D.

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1           And for Class D structure systems and  
2 components, considered to be risk significant as  
3 defined in the reliability assurance program,  
4 provisions are made to check for operability,  
5 including appropriate testing and inspection and  
6 repair out of service structure, systems and  
7 components.

8           Our focus on Class D systems is to keep  
9 them in operation, make sure they are in operation  
10 when you engage in certain activities, particularly  
11 during an outage or repair activities, rather than on  
12 the qualification of the equipment beforehand.

13           Then the NS buildings containing Class D  
14 structure systems and components, as well as the  
15 anchorage of those structures, systems and components,  
16 to the building are designed to the seismic  
17 requirements of the Uniform Building Code.

18           The systems and components are generally  
19 not designed for seismic loads. In some cases they are  
20 adjacent to safety class equipment, which makes them  
21 category two. But generally they are not designed for  
22 seismic loads.

23           We do have several open items from the  
24 staff. The first one here on the table, the staff has  
25 indicated that they think seismic requirements are

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1 required for Class D systems. We obviously have to  
2 have further discussion with the staff on this.

3 The second one was, we didn't include the  
4 seismic classification for electrical and some other  
5 equipment in Table 3.2-3. That's the larger table I  
6 referred to. The guidance indicates that that is a  
7 table of mechanical and fluid systems components. We  
8 would expect to provide this information in some  
9 manner. We haven't worked out the details on what we  
10 are going to do, whether we will put the electrical  
11 equipment there, add another table, or include it in  
12 Chapter 8.

13 But we will need to talk with the staff  
14 when we resolve that.

15 The staff also asked for augmented QA for  
16 the seismic category two structure systems and  
17 components. We need further discussion with the  
18 staff. The 06 one, they requested a list of systems  
19 required for continued operation. We have submitted  
20 an RAI response for this. We have not yet heard back.

21 They asked for supplemental requirements  
22 for risk-significant RTNSS systems. We do have the  
23 reliability program, so we need additional discussion  
24 with the staff on what they think is required above  
25 and beyond this.

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1           And then we do need to make additional  
2 corrections to the table from the extended condition  
3 coming out of the audit. These - we got these open  
4 items when they came out with the ESR. We did not  
5 have RAIs coming out of the audit. We only fairly  
6 recently received these.

7           CHAIR RAY: I think the observation here  
8 is that this seems like perhaps it's coming to us  
9 prematurely; it's going to have to come back when  
10 these things are resolved.

11           MR. LINDGREN: We wanted to let you know,  
12 we have open items.

13           MEMBER RYAN: I understand. They're quite  
14 significant, and rather than exchange in a debate  
15 about them now, it seems like the observation to make  
16 is, well, keep up the work and come back when you are  
17 done.

18           MEMBER SHACK: Yes, but coming back to  
19 your original question, is this only true for example  
20 for the new diesel generators, or was this a question  
21 that somehow involves other Class D or RTNSS systems  
22 that somehow you thought would have been addressed in  
23 the 015?

24           MR. LINDGREN: They were addressed in Rev  
25 15. We have not changed the classification, or the

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1 requirements for Class D systems. The staff is  
2 suggesting that we should. For all of the Class D or  
3 RTNSS systems.

4 CHAIR RAY: I mean I can imagine the  
5 debate that is going on on these various topics might  
6 be fun to engage in that debate. But it seems like it  
7 ought to take place with staff.

8 Again, I understand these aren't new  
9 diesels, these are newly reclassified diesels that  
10 were in the original design. What the implications of  
11 that are perhaps we will pursue with the staff.

12 Because when you were describing it, you  
13 said, provide added this and added that. Well, that  
14 sounds like it's doing something different, not just  
15 called by a different name. So any members who have  
16 questions who want to pursue this of course we should  
17 do that here. But for my part I would just say it  
18 seems like we are some distance away from being able  
19 to do a full review of this section, given the nature  
20 and extent of the open items.

21 MS. McKENNA: The staff will make a  
22 presentation later on what they were looking at, why  
23 they were raising these issues, so you can decide at  
24 that point whether you want to engage at this time or  
25 when you come to closure.

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1 CHAIR RAY: No, I understand, thank you  
2 Eileen, we'll do that. It may turn out that, oh well,  
3 we understand all this well enough we don't need to  
4 come back and review it again. It's just my judgment  
5 that with all these open items that we don't want to  
6 get in between the staff and the applicant at this  
7 juncture with these kinds of outstanding issues.

8 MR. SISK: I would say, Mr. Chairman,  
9 that Westinghouse is clearly going to be working with  
10 the staff to close out these open items and continue  
11 these discussions.

12 CHAIR RAY: Sure. Right.

13 I guess the question is, should we  
14 continue to --

15 MS. MCKENNA: Well, let me ask maybe a  
16 question with the committee, the way we have it  
17 structured is, we have several presentations from  
18 Westinghouse, and then several from the staff. And it  
19 could be, if it's more understandable, we could do  
20 kind of point-counterpoint if you will, let  
21 Westinghouse present a particular section and the  
22 staff present a particular section; move on then to  
23 another topic; so you wouldn't have to keep in your  
24 mind, okay, we have these three or four subjects. We  
25 are flexible. We are prepared to do whatever you

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1 think would be most understandable for you.

2 CHAIR RAY: Okay, let me poll the  
3 committee - yes, go ahead.

4 MEMBER BONACA: If you plan to discuss  
5 the RTNSS issue I would like to hear about that.

6 MS. McKENNA: Okay, I believe we have the  
7 staff.

8 MEMBER BONACA: Just to see if there has  
9 been any change from what we understood the  
10 requirements were.

11 CHAIR RAY: It's my judgment that  
12 probably point and counterpoint works better just for  
13 people's ability to track these things. But again I  
14 perceive that we don't want to - mediating between --

15 MS. McKENNA: That's right -  
16 (Simultaneous speakers.)

17 CHAIR RAY: -- trying to tell you what we  
18 think the right answer is before you guys have done  
19 your work.

20 MS. McKENNA: All right, then we can just  
21 continue on the path we were on.

22 CHAIR RAY: Other members have any input?  
23 Just so we get to it.

24 MEMBER BANERJEE: You might have to  
25 remind us.

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1 MR. SISK: Don't worry, we will.

2 MS. McKENNA: Certainly the staff will be  
3 covering its open items when it gets into its  
4 presentation, so that would be a time to refresh you  
5 on where they see the issues.

6 MR. SISK: We have several sections.  
7 Then we'll just work through those.

8 MS. McKENNA: That's fine.

9 CHAIR RAY: Go ahead.

10 MR. SISK: The next section we are going  
11 to talk about is 3.6, piping. And once again, Don.

12 MR. LINDGREN: Okay. Section 3.6 is  
13 postulated pipe rupture dynamic effects. The changes  
14 we made were to break locations. We updated due to  
15 design finalization efforts. The break locations have  
16 to be at terminal ends and certain other places.

17 We changed to balance a plant valve used  
18 for mitigation due to turbine changes. Traditionally  
19 the non-safety valves on the turbine - the stop valves  
20 and the like - are used to mitigate a specific failure  
21 of a main steam isolation valve. We changed turbine  
22 suppliers that has a different name for those, and  
23 some different information, so that changed in that  
24 area.

25 The hot water heating system was a high

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1 energy system. We redesigned it so it's a moderate  
2 energy system; this was primarily a customer request.

3 And then the main steam pipe material change was  
4 changed as a result of design finalization, and  
5 addressing erosion/corrosion.

6 (Off-mic comment.)

7 MR. SISK: Can you come to the mike and  
8 give your name so you go on the record.

9 MR. KOTWICKI: Phil Kotwicki,  
10 Westinghouse. The material change from a carbon 106B  
11 to a B11.

12 MEMBER ARMIJO: Why did you make those  
13 changes?

14 MR. KOTWICKI: Why?

15 MEMBER ARMIJO: Yep.

16 MR. KOTWICKI: As Don mentioned, the  
17 velocities in the steam line were a little higher,  
18 and as a result of design finalization there was extra  
19 margin that was thought to be necessary for that type  
20 of material, so it was changed to more chrome.

21 MEMBER ARMIJO: You are addressing flow  
22 accelerated corrosion with that change?

23 MR. KOTWICKI: Right.

24 MEMBER ARMIJO: Okay, so my question was  
25 along that line. But you changed the mainstream pipe.

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1 Did you change any other vessel material, nozzle  
2 materials, in order to accommodate the change to 335?

3 MR. KOTWICKI: Any connections would have  
4 had to have been made compatible. But the components  
5 that they tied into, the equipment that they tied  
6 into, remain the same.

7 MEMBER ARMIJO: You didn't change  
8 anything like the pressurizer vessel, the steam  
9 generator vessels, or anything else?

10 MR. LINDGREN: The primary components are  
11 either stainless steel or clad with stainless steel.  
12 And have general stainless steel safings. This is the  
13 steamline that we changed to address that.

14 MEMBER BANERJEE: I guess I have a  
15 question regarding the break locations, the updated -  
16 you say the design finalizations. Can you give me a  
17 couple of examples of what happened there.

18 MR. LINDGREN: I look to Phil, again. Do  
19 you remember?

20 MR. KOTWICKI: Again, like Don mentioned,  
21 most of the break locations are terminal ends. So  
22 most of the terminal ends are still terminal ends. I  
23 believe one of the things that happened was the  
24 addition of the heat exchanger on the pumps which  
25 generated actually new locations that were not

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1 identified before, because that heat exchanger didn't  
2 exist in the past.

3 MEMBER BANERJEE: Do you have a sketch  
4 showing the break locations, where they are? You've  
5 got a piping package finalized now I take it.

6 MR. KOTWICKI: Are you asking then the  
7 DCD or --

8 MEMBER BANERJEE: You are saying it's  
9 updated due to design finalization. But as you know  
10 piping package is not finalized. The location  
11 somewhere - which I'd like to see.

12 MR. SISK: This is Rob Sisk,  
13 Westinghouse. I think part of that is still ongoing.  
14 The staff has been doing an audit of our piping  
15 packages. You will hear more about that shortly in  
16 the discussions. The piping package are more  
17 finalized. I think it usually is finalized. But we  
18 are working through that with the staff to get to a  
19 point where both the staff and Westinghouse have  
20 reached a level of completion on the piping package  
21 that is necessary for circulation.

22 MEMBER BANERJEE: So you haven't  
23 finalized the piping package yet?

24 MR. SISK: The piping packages are not  
25 yet finalized.

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1 MEMBER BANERJEE: So the break locations  
2 are not finalized?

3 MR. SISK: By definition, true. But we  
4 do have a good idea where the breaks are, as Mr.  
5 Kotwicki was pointing out we know where the terminal  
6 ends are. By definition until the piping packages  
7 are done you won't say that we are completely done.  
8 But we have a very good idea of where those piping  
9 runs are, where the end points are. We are - have  
10 been working with the packages - provided the packages  
11 to the staff for review, and there are things that  
12 have to be resolved on those piping packages to bring  
13 them to completion.

14 MEMBER BANERJEE: The break locations  
15 relate to also forces, reaction forces, what happens  
16 to the insulation, how it impacts our thoughts about  
17 debris, very wide implications to break locations. So  
18 I'd like to see a diagram where these break locations  
19 are.

20 MR. SISK: And we are doing a report, and  
21 we will tell the NRC that later this year we are doing  
22 a pipe rupture hazard analysis that will discuss where  
23 those breaks are.

24 MEMBER BANERJEE: Oh, so that hasn't been  
25 done?

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1 MR. SISK: That is not a completed effort  
2 at this time.

3 CHAIR RAY: Okay, let's take an action  
4 item, if I can ask Mike to make sure he follows up on  
5 it to respond when the appropriate time the  
6 information you are requesting.

7 MEMBER BANERJEE: Right, because there  
8 are other implications that we have to assess. As I  
9 said, they are going to do an analysis of reaction  
10 forces and supports and all sorts of stuff.

11 CHAIR RAY: I would have thought give the  
12 subject and the discussion that there was a DAC or  
13 something that applied to this topic in the certified  
14 design, and that this was a process maybe, as we've  
15 seen elsewhere, addressing that -

16 MR. CUMMINS: This is Ed Cummins. I  
17 think you have that exactly correct. There is  
18 information in the certified design, in the DCD, which  
19 lists I'll say rooms, rooms that have high energy  
20 piping and interesting targets, let's say, it's a  
21 table-like thing. And it doesn't evaluate anything.  
22 It just says, here are places where we have a  
23 coincidence of high energy pipes with break locations,  
24 and equipment that might need to be protected. So  
25 it's not a design, but it's a summary of the general

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1 issue of piping and hazards.

2 There is a DAC that says, perform the  
3 piping analysis, and perform the pipe hazards report,  
4 and we are going to talk about that later in this  
5 meeting, in the section.

6 CHAIR RAY: All right.

7 MEMBER BANERJEE: In any case three  
8 implications that I am interested in. One is clearly  
9 related to the analysis you do of forces and things  
10 like that. Second the impact of the jets and so on  
11 generating debris. What implication that has on how  
12 you deal with some screen blockage. And the third of  
13 course is related to LOCA itself. So all of the  
14 above are involved.

15 CHAIR RAY: So this is similar to the  
16 discussion we are having on human factors about, well,  
17 there was a DAC, and now we are addressing elements of  
18 that in a way that we can better understand it. I  
19 think at this point it's sufficient to simply take  
20 note that your interest is in seeing how that is  
21 resolved, assuming it is resolved, during this DCA,  
22 during this amendment to the certified design.

23 MR. LINDGREN: Just to complete the  
24 thought on this one, what we are referring to in this  
25 changes are like the ADS valve package on top of the

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1 pressurizer was being designed and things were moving  
2 around which would move terminal ends, sometimes an  
3 elbow - or not an elbow, a T can be a terminal. So  
4 that is what we were addressing here, and yes, I will  
5 get to it later in my presentation, we are completing  
6 a pipe rupture hazard analysis that will require  
7 additional changes.

8 MEMBER BANERJEE: I presume you have also  
9 closed the DAC then on the layout of the DBI line.

10 MR. LINDGREN: We don't have a DAC  
11 specifically for it.

12 MEMBER BANERJEE: Well, you have a  
13 general DAC, and now you have --

14 MR. SISK: We are in the process of  
15 trying to close out those - the DAC associated with  
16 the piping. We are not through that process yet, and  
17 we are working with the staff to hopefully get to a  
18 point where we can say they are closed. But it is not  
19 yet at this point in time.

20 MEMBER BANERJEE: Let's say when you  
21 close it you then have a design for the DBI line with  
22 all its supports, where the valves are any everything.

23 MR. LINDGREN: We need to move to the  
24 next page. We didn't have a DAC on the pipe rupture  
25 analysis. We did have a COL information item. We

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1 have revised that COL information item to indicate  
2 that most of it will be done as part of the design  
3 certification review.

4 We anticipate that perhaps not all the  
5 pipe rupture with restraints become either a license  
6 condition or a DAC.

7 MEMBER BANERJEE: -- the COL then? Or  
8 what will be your - I don't know how you are dividing  
9 what will be closed in the design certification and  
10 what will be part of the COL?

11 MR. LINDGREN: That would have to be  
12 closed by the COL applicants. It's primarily a timing  
13 problem.

14 MEMBER BANERJEE: It would be helpful to  
15 know that division at some point.

16 MR. SISK: Well, the understanding with  
17 the staff at this point, and I certainly would not  
18 want to speak for the staff, but at the time when the  
19 pipe rupture hazard analysis, there is an  
20 understanding that all the whip restraints would not  
21 be completed at this point in time, and that a license  
22 condition would be incorporate to address additional  
23 whip restraints.

24 I think that's where we are at this point  
25 But I do want to reemphasize we are continuing to

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1 work with the staff to make sure that we have a great  
2 success path to closure on this issue.

3 MEMBER BANERJEE: And also I guess, is  
4 that the same thing with regard to placement of  
5 insulation and debris generation? Would that become  
6 then something that you close in the COL?

7 MR. LINDGREN: No, the whip restraints  
8 generally don't protect you from ripping up  
9 insulation.

10 MEMBER BANERJEE: No, I realize that.  
11 That's a different topic.

12 MR. LINDGREN: Well, but that is one of  
13 the topics that is considered in the break hazards  
14 analysis. Now remember that inside containment, we  
15 have no fibrous insulation. That is still the case.

16 MEMBER BANERJEE: That is very laudable.

17 MR. LINDGREN: Well, it's necessary. But  
18 all of that, that is one of many things that we are  
19 including in our pipe rupture hazards analysis. We  
20 had a preliminary design review on it a couple of  
21 weeks ago, so we had a lot of people doing a lot of  
22 work to define the break locations, to find the breaks  
23 that require work restraints, defining the targets.  
24 Once you find the targets in some cases you have to  
25 add a whip restraint, because you don't like the

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1 targets you've got.

2 As we complete the piping packages we are  
3 finding a few intermediate break locations, which are  
4 - depending on - there is a stress criteria for those.

5 So those have to be added to the analysis.

6 We as I said, we anticipate completing  
7 that activity to support design - in design  
8 certification review. We will have all the break  
9 locations defined. We will have all the targets of  
10 those breaks. We will have defined where we need whip  
11 restraints with protection shields. We may not have -  
12 we may not complete all of the whip restraint designs.

13 That may be left as a license condition or a DAC.

14 MEMBER BANERJEE: You also have completed  
15 all the specifications of the insulations and the  
16 materials?

17 MR. SISK: We will be talking more about  
18 that. We hope to come before the committee in the  
19 future to talk about GSI-191, what we are doing with  
20 regard to insulation and debris loading, potential  
21 fiber loading and debris loading for the - the sump I  
22 think was the question or concern you have. And we  
23 will talk more about that in terms of its impacts on -  
24 -

25 MEMBER BANERJEE: We also would of course

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1 like to know about jet shields and zone of influence  
2 and all the details.

3 MR. SISK: In terms of what --

4 MEMBER BANERJEE: The system.

5 MR. SISK: Absolutely.

6 MR. CUMMINS: This is Ed Cummins. The  
7 Chapter 6 discussion of sump screens and debris  
8 generated by the break just because the breaks can be  
9 anywhere don't depend directly on the pipe hazards  
10 analysis, and depend instead on some conservative  
11 assumptions about debris based on the diameter of the  
12 pipe and the field of the zone of influence that  
13 resulted from that.

14 So there is not a direct connection  
15 between debris generation and the pipe break hazards.

16 There could be, but it would just be infinitely  
17 complicated to go around and do break by break  
18 analysis of this.

19 MEMBER BANERJEE: Well, as long as you  
20 are conservative.

21 MR. SISK: It might be best to have that  
22 discussion with the GSI.

23 CHAIR RAY: I think that is the main  
24 point, Sanjoy, I just want to capture the full scope  
25 of what it is that needs to come back when it's

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1 studied.

2 MEMBER BANERJEE: It brings back my point  
3 yesterday, which is, we need to sort of aggregate  
4 these things, so people who are likely to know  
5 something about it are here at the time they are  
6 discussed. And hopefully they can be aggregated in  
7 some way that you don't have to attend meetings where  
8 you don't have any expertise.

9 CHAIR RAY: I'll take that as an  
10 admonition.

11 (Laughter.)

12 In any event we will do our best to do it.

13 I just don't want to overlook it as well.

14 I guess we are ready to proceed.

15 MR. LINDGREN: So we have worked  
16 considerably with the NRC on developing our pipe  
17 rupture hazard analysis requirements, and addressing  
18 the COL information so we can complete it during the  
19 design certification amendment review.

20 The leak before break, there was an as-  
21 designed COL information item that we have basically  
22 completed. There will be some additional staff review  
23 of the final piping packages, and to look at the  
24 effects of our change in seismic input from the hard  
25 rock to the six soils cases.

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1           So we need final confirmation, and we  
2 expect that to happen during the NIC audit of the  
3 piping packages.

4           And then there was - we had an as-built  
5 COL information item on leaks before break that we  
6 deleted because it was redundant with an ITAAC  
7 requirement for the same thing.

8           We do have a couple of open items of  
9 fairly major significance. There is one that  
10 addresses the rupture hazards analysis. There was one  
11 part of it - wanted confirmation that we were  
12 addressing leaky cracks through wall cracks. We are  
13 doing that, and it will be included in the analysis,  
14 in the reports. And there is also one that says we  
15 need to complete the pipe break hazards analysis.

16           As I said, we are working diligently to do  
17 that. As I said, we expect some kind of COL  
18 information item license or an ITAAC to address the -  
19 any pipe whip restraint designs that are incomplete.

20           CHAIR RAY: I got a process question at  
21 this point.

22           The statement, complete as designed pipe  
23 break hazards analysis report, should I understand  
24 that to be something that you decided you wanted to do  
25 as part of this amendment to the design certification?

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1 Or is it something you received via a requirement  
2 that has appeared after the Rev 15 design  
3 certification?

4 MR. LINDGREN: Part of it is ours. There  
5 were COL information items on completing the piping  
6 designs and providing design specifications and design  
7 reports for all the components including the piping  
8 design. It has been a challenge, and we are working  
9 through it.

10 CHAIR RAY: But again I understand it is  
11 something you have elected to do as part of this?

12 MR. LINDGREN: We have elected to do it.  
13 There was a - in the next session we will talk about,  
14 there was a piping DAC, and we elected to get rid of  
15 that as part of our improved design and  
16 standardization, so you are getting one design, not  
17 multiple designs, from COL applicants.

18 MS. MCKENNA: Just a comment. If  
19 something is a COL information item that is in the  
20 DCD, then at the time the COL applicant puts forward  
21 their application they will have to address those  
22 items, so if it wasn't part of the DCD then the COLs  
23 would have had an action to do something with respect  
24 to this as designed, and I think as was mentioned on  
25 several occasions yesterday one of the aims of

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1 Revision 17 was to deal with a number of these COL  
2 information items as part of the certification. And  
3 this is kind of in that category.

4 MR. LINDGREN: The second one there is on  
5 the leak report break analysis. The NRC reviewed this  
6 early in the process. And it's looking to confirm  
7 that we still meet the requirements for our expanded  
8 seismic spectra for other than hard rock, what we've  
9 called the six-soils case. Something you won't be  
10 hearing about this time, but it is part of our  
11 application, our amended application, is to increase  
12 the seismic conditions for which this plant is  
13 certified.

14 As I said we expect this review to be part  
15 of the piping DAC.

16 Section 3.12 is a section in the SER that  
17 you will not find in the DCD. We put the piping  
18 requirements in Section - some in Section 3.9, some in  
19 Section 3.7, but the SER has a piping package - well,  
20 there is one major open item that we need to prepare  
21 for NRC review. Class 1, 2 and 3 risk-significant  
22 piping analysis to complete resolution of the piping  
23 DAC. We have been working toward this goal for a  
24 couple of years now. We included piping analysis  
25 packages, 48 of them are the risk-significant piping

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1 packages, that was a list of the - what the NRC  
2 determined based on the information we gave them, we  
3 provided them for NRC review from February through  
4 June of this year.

5 The analyses address stress analysis, port  
6 designs, fatigue analysis. Some of the analysis  
7 information is based on the envelope of preliminary  
8 values, such as weight and CG of the valves, since we  
9 haven't prepared the valves yet.

10 The staff has done review, started an  
11 audit. They consider the piping packages are not  
12 complete due to open items and other issues. We  
13 understand the staff to consider complete means  
14 analysis package that shows you meet all ASME code  
15 requirements. We are continuing to work on the design  
16 packages to complete them. We are performing an  
17 extended condition evaluation to look at the packages  
18 the staff did not review to see if there are other  
19 areas that require additional analysis to address the  
20 same open items.

21 We do continue our piping design efforts  
22 to prepare CFC design documents for plans for  
23 building. That's not something we provide to the  
24 staff, but it's more than just the licensing schedule  
25 that we are working to.

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1           And a final audit meeting is needed to  
2 complete review and response to NRC questions and  
3 issues. We have not scheduled that yet. We need to  
4 move towards completion on the analysis packages and  
5 know when we are going to complete before we schedule  
6 that meeting.

7           MEMBER BANERJEE:     Just a question. Are  
8 those sorts of industry use packages which evaluate  
9 the stresses and things like this?

10          MR. LINDGREN:        You mean the analysis  
11 codes?

12          MEMBER BANERJEE:     Yes, so do they take  
13 into account things like thermal stresses and --

14          MR. LINDGREN:        Bill, would you like to  
15 address this?

16          MEMBER BANERJEE:     Because I assume there  
17 is thermal striping possibilities, all sorts of things  
18 can happen, right. So I just wanted to be informed  
19 about how this analysis is done for the stresses.

20          MR. KOTWICKI:        We have standard industry  
21 codes --

22          CHAIR RAY:        Give your name.

23          MR. KOTWICKI:        Phil Kotwicki of  
24 Westinghouse. We have standard codes that we use that  
25 are identified in the DCD. So we have already done

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1 piping benchmark programs for those codes. The one we  
2 use for most of our work is a program called Pipe  
3 Stress, so that's where we would handle most of the  
4 work that is associated with your standard piping  
5 analysis.

6 If you need to get a little more detailed  
7 you can get into some time history analysis with  
8 programs like ANSYS.

9 MEMBER BANERJEE: Oh, you need to get  
10 into that detail?

11 MR. KOTWICKI: Not that often.

12 MEMBER BANERJEE: But now these have  
13 loads due to valves and bends or whatever, but of  
14 course there are loads due to flow, there are loads  
15 due to temperatures, potentially loads due to  
16 stratification and vortexing, all sorts of things.  
17 How do you put that into your calculations? For  
18 example I remember the French had this big problem  
19 with dead ends where they had vortexes that used to go  
20 in and out of this dead end giving a cyclic load, and  
21 eventually a fatigue problem. How is that sort of  
22 thing handled just as a matter of information.

23 MR. KOTWICKI: We have identified certain  
24 locations where thermal stratification or striping,  
25 like TASCs's is kind of the terminology used for it.

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1 But we can be doing a basically a CFD analysis that  
2 will provide the profile that the pipe cross section  
3 will see associated with those events. And that can  
4 be fed in, again, to an ANSYS or a Pipe Stress model,  
5 which if you've got a Class 1 line can also be  
6 incorporated into the fatigue analysis.

7 MEMBER BANERJEE: So eventually you  
8 evaluate the high risk areas in some way, and if you  
9 decide you need to do more detailed analysis you use a  
10 finite element code or something like that?

11 MR. KOTWICKI: There is a screening  
12 evaluation that is done to identify locations where we  
13 think there may be that potential. You do a certain  
14 amount of analysis to see whether that potential has  
15 been realized, and in some cases you go to the next  
16 step and actually do a more sophisticated analysis to  
17 generate the inputs that you would need to evaluate it  
18 in a piping analysis phase.

19 MEMBER BANERJEE: I guess this design in  
20 many ways has got features like ADS valves and things  
21 like that which are not that common, or not there in  
22 other systems, and these valves of course have dead  
23 ends, I mean they are sticking out of the pipes. And  
24 I remember some very interesting experiments that I  
25 saw in Chatou in EDF, that they were looking at the

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1 formation of structures that went into these dead  
2 ends, and they went back and forth, field structures,  
3 vertical structures. And they gave risk to a cyclic  
4 load in terms of thermal stresses.

5 And that's the sort of question: is the  
6 staff using - well, I should ask the staff that  
7 question. But maybe we have to wait until the staff  
8 decides to tell us what they are doing. But let's see  
9 your calculations. Do they take phenomena like this  
10 into account?

11 MR. KOTWICKI: And, again, I explained  
12 there is a certain amount of evaluation that is done.

13 We do count on things like cold traps where you have  
14 got hot water and you've got stagnant conditions  
15 basically. And you've got a difference in elevation  
16 where you expect hot to be up here, and cold to be  
17 down here. And we do need to do some kind of an  
18 evaluation to verify that, so analytically we show  
19 that that is true, and we can analyze the  
20 stratification that occurs in going from the warm to  
21 the cold, and that is incorporated into our analysis.

22 I mean without getting into a ridiculous amount of  
23 detail.

24 MEMBER BANERJEE: Right, you're just  
25 giving an overview, so you can't get into the details.

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1 But I had sort of remembered that this used to be  
2 quite a problem with some of the TWRs, the dead ends,  
3 sticking on to their pipes, and that is really the  
4 reason for this question.

5 CHAIR RAY: Do you want to follow up on  
6 this issue of dead ends? That seems to be a  
7 particular phenomenon --

8 MEMBER BANERJEE: I need to find out what  
9 the French did at the end. If they are still alive.  
10 The problem is these things go back 25 years.

11 MR. KOTWICKI: And there have been EPRI  
12 programs that have gone out and measured these things,  
13 and that's where we are getting kind of our screening  
14 criteria. There are documents out there that say when  
15 you have got these kinds of conditions, you need to  
16 look for this kind of profile for instance.

17 MEMBER BANERJEE: Let me ask the staff,  
18 is the staff aware of this issue with dead ends and  
19 vortex formation and oscillations in piping which  
20 gives rise to cyclic thermal loads?

21 MR. HSU: Okay, this is Robert Hsu.

22 About the condition you are asking about,  
23 this was the PWR. In the PWR design history we  
24 haven't seen that issue yet.

25 MEMBER BANERJEE: I thought the French

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1 built PWRs.

2 MR. HSU: Those were BWR or PWR?

3 REPORTER: Back away from the mike a  
4 little bit.

5 MEMBER BANERJEE: P as known as  
6 pressurized. I thought the French were building PWRs.  
7 I didn't know about French BWRs.

8 MR. LINDGREN: If I can, we have - we  
9 identify in the DCD the lines that we identify as  
10 potentially susceptible to stratification and  
11 striping. We - and those are ones that require  
12 additional analysis.

13 Part of the advantage of the AP1000 is we  
14 were starting designing after we knew about these  
15 issues, so you will see design features that we have  
16 to avoid and it's generally simple things like keep  
17 the pipe continuously rising so you don't have a dip,  
18 and if you have looked at our pressurizer surge line,  
19 you will see that there are quite a few sets of  
20 criteria to come up with that shape.

21 CHAIR RAY: Okay, but it's clear that  
22 Sanjoy is talking about something that is different  
23 than what you are just now discussing.

24 MEMBER BANERJEE: Well, no, I think he is  
25 addressing some of it.

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1 CHAIR RAY: But striping and the dynamic  
2 effects that you are talking about that give rise to  
3 fatigue stresses aren't the same. It just seems to me  
4 like it would be advisable for us perhaps later today  
5 come back and see if we can't better answer your  
6 question, Sanjoy, Or at least identify it as  
7 something to be answered later. Because it sounds  
8 like it's something that needs to be --

9 MEMBER BANERJEE: As an informational  
10 item, I'm sure they probably have looked at what  
11 happens to say the ADS-4 line. I'm sure that  
12 Westinghouse would have done that. I don't know  
13 exactly what you did. I think the staff knows what  
14 you did. So just tell us what you did.

15 For example that is a dead end. What do  
16 you do with that? So take that as an example. If you  
17 have this ADS core line sitting on - I guess wherever  
18 it's sitting precisely, and is it facing vertically up  
19 or is it horizontal?

20 MR. KOTWICKI: The ADS-4 line comes off a  
21 hot leg, comes off each hot leg, and is tied into  
22 squib valves that will open during certain events.  
23 But it has this difference in elevation that we talked  
24 about. It's basically a stagnant line that has, as I  
25 mentioned, warm on the top and cool on the bottom. As

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1 you go from warm to cool you have something going on  
2 from a thermal systems point of view, or a thermal  
3 hydraulic point of view, could generate little cells  
4 that could move water around. I think the main issue  
5 from our point of view is to put something into our  
6 evaluation that conservatively addresses that kind of  
7 issue, so we've got - we've basically got the  
8 stratification part of that, and if it is appropriate  
9 we would account for the movement of a boundary.

10 MEMBER BANERJEE: And that's exactly what  
11 is found in experiments, that the boundary moves up  
12 and down with a certain frequency.

13 MR. KOTWICKI: And the CFD codes, these  
14 computational fluid dynamics codes, that tries to  
15 handle these kinds of things, you can turn them on and  
16 start them running and let them go for months at a  
17 time to try to determine where this thing ends up.  
18 What we try to do is a much more straightforward - we  
19 are doing piping analysis. We need to do a lot of it.

20 You need to try to bound it if you can by what we  
21 know, and I'm not sure we know all that much. There  
22 is some data out there that suggests that when you  
23 deal with this kind of analysis you get this kind of  
24 thing. Some of these have actually - not this  
25 particular configuration, but stratification has

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1 caused some leakage because you get this kind of  
2 thermal cycling that gets you enough cycles of enough  
3 magnitude to cause a problem.

4 MEMBER BANERJEE: So that is really -  
5 because as you know, we all agree, CFD codes are not  
6 reliable . First of all most of them have been tuned  
7 to handle sort of steady, relatively steady flows. So  
8 what we are talking about here is an oscillation which  
9 most commercial CFD codes would not be at all reliable  
10 in estimating. So you are basically having to rely on  
11 experiments. And there have been a lot of experiments  
12 done. But they are rather geometry sensitive. And so  
13 if you have taken a conservative approach to this,  
14 then clearly it's fine, and you have enough margin and  
15 stuff like that with regard to the cycling.

16 But as you know this cycling has caused  
17 problems in the past. So -- and it's not only in  
18 BWRs, PWRs as well. So it's sort of - you know, I'm  
19 just trying to get my hands around how the analysis  
20 was conducted. And I'm sure that Westinghouse  
21 identified in some ways the regions which are high  
22 risk and went through this in some systematic way and  
23 the information is available.

24 And we don't have the time to get into the  
25 details here. But really the question then goes to

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1 the staff, how did this sort of confirmatory analysis  
2 was formed to make sure that there were not locations  
3 that could lead to high stresses and things like that,  
4 or fatigue, or cycling were missed or not. There is  
5 an audit function. So perhaps I should just hold this  
6 question until we have the staff up here and then  
7 we'll ask them.

8 MR. WU: This is John Wu from the  
9 Engineering Mechanics Branch. To answer Dr.  
10 Banerjee's questions, there is a dead end which occurs  
11 a lot, and very often in PWR. These kinds of  
12 situations normally you define as acoustic resonance.

13 That means you have a dead end pipe go to the ADS,  
14 and then fluids getting in and out through it, when  
15 you fit in pipe, the length is about one quarter of  
16 the whip length. In this case also the baseline  
17 geometry, that means the pipe - this is - you know you  
18 got some kind of vortex - vortex shedding, those kind  
19 of stuff.

20 MEMBER BANERJEE: I don't want  
21 to stop you, but I think we are talking about two  
22 different phenomena. I think I am talking about a  
23 phenomena where this pipe is full of a single phase  
24 liquid, which relates to the vertical structures which  
25 form at the dead end, and the vortexes are not steady;  
they move in and out. And if you have stratification

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1 above that then the front moves back and forth,  
2 causing stresses, and it's been known to lead to some  
3 problems.

4 Clearly this is something which  
5 Westinghouse is aware of and has certainly taken a  
6 look at. I'm wondering whether the staff has or not.

7 MR. WU: What I am using is probably  
8 different, maybe should look at - yes also depend on  
9 the vortex shedding frequency, in this case

10 MEMBER BANERJEE: Not shedding --

11 MR. WU: When the vortex go in the  
12 go in the pipe, go in the stagnation pipe, go in the  
13 stagnation pipes and come out.

14 MEMBER BANERJEE: It sits in the --

15 MR. WU: Right, right, similar to the  
16 full line --

17 MEMBER BANERJEE: It's not an acoustic  
18 phenomena. Nothing to do with acoustics.

19 MR. WU: It's also related to the whip  
20 length. Because it's something to do with vortex  
21 shedding frequency, and that is a - yes.

22 MEMBER BANERJEE: It's a vortex shedding  
23 phenomena. It's nothing to do with acoustics - it's  
24 nothing to do with an acoustic wave.

25 MR. HSU: Okay, this is Robert Hsu

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1 speaking. The issue you are talking about, which is  
2 already addressed by the interchange which is  
3 proposed, this is called a swirling turbulence  
4 penetration. So coming back and forth. And this  
5 industry already proposed in the MRP-146, and issues  
6 they are talking about what kind of geometry when you  
7 have this kind of thing. Your vertical length, and  
8 then if you can meet those vertical lengths of design  
9 configuration then you are not going to be subject to  
10 the horizontal thermal stratification. This case is  
11 already - staff has already addressed in the KCD.

12 MEMBER BANERJEE: Let us take this up  
13 when you come up. And maybe you can in the time in  
14 between check what other people have done on this,  
15 because I think there is a lot of work that has been  
16 done on this, and I have seen some very beautiful  
17 experiments. But I don't know that they are  
18 completely resolved in terms of how to scale them, and  
19 the situations which occur. So you have to take  
20 probably a fairly conservative approach to trying to  
21 estimate the kinds of loads and cycling that occur.

22 And what I am really asking, I'm sure they  
23 have screened it, they have found where it occurs,  
24 they have taken an approach - they have probably taken  
25 a very conservative approach, and everything is fine.

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1 But how did the staff determine that? That's really  
2 the question. How did you do an audit calculation,  
3 and how did you find out what the stresses were? So  
4 let's hold this, and come back to the situation.

5 CHAIR RAY: Thank you.

6 MR. LINDGREN: We are ready to move on?  
7 To close out piping, it is a critical issue with us,  
8 and we are working with staff to resolve the open  
9 items.

10 To move on, now I get to an even finer  
11 breakdown, start going by subsection here. In 3.9.1,  
12 the primary part of 3.9.1 are the design transients we  
13 use. There are a couple of other minor additions such  
14 as the codes we use.

15 But the changes we made, we added a  
16 specific daily load follow transient to the tune of  
17 17,800 events. We reduced the unit loading and  
18 unloading transients by a like amount to 2,000 events.

19 If you add up the two, that comes out one a day for  
20 60 years of life.

21 We revised the reactor coolant pump  
22 startup and shutdown transient - now, okay, those, the  
23 reasons we did that was design finalization. We had  
24 difficulties satisfying peak requirements for - I  
25 believe it was the steam generator, but one of our

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1 components - internals - okay. We revised the reactor  
2 coolant pump startup and shutdown transient to more  
3 accurately reflect the reuse of variable speed drives  
4 to start and slow them down.

5 We increased the pressurizer spray and  
6 heater cycles for load regulation to more accurately  
7 reflect how these things work, and we revised the RCS  
8 pressurization transients specifically for the steam  
9 generator to have a combination of causes rather than  
10 one, basically, because of the results of the fatigue  
11 analysis, the way we use passive safety features in  
12 this plan is a particular challenge across the two  
13 steam generators.

14 MEMBER ARMIJO: Let me ask a question on  
15 your load volume transients. Now those were not in  
16 the original DCD?

17 MR. LINDGREN: What we intended to do was  
18 have the unit loading and unloading transients handle  
19 the load to follow.

20 MEMBER ARMIJO: So you basically took the  
21 original 19,800 loading and unloading transients and  
22 broke it up into two parts, a milder load following,  
23 and then the more severe loading and unloading?

24 MR. LINDGREN: Yes, that's what we did.

25 MEMBER ARMIJO: Okay, I understand you,

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1 thank you.

2 MR. LINDGREN: So these really are a  
3 result of design finalization, and people doing the  
4 fatigue analysis for the components, so lessons  
5 learned out of that is why these were changed.

6 We have some open items that are not  
7 associated with transients. There is also a table in  
8 this subsection that deals with the computer codes one  
9 uses. We have a code in piping analysis called  
10 WESTEMS that does fatigue analysis. And we did not  
11 include it in that table; we will include it in that  
12 table. And it's part of the audit of that that we  
13 have some open items that are related to validation  
14 and verification. That's one of the open items in  
15 3.9.1 that are about fairly detailed and technical --

16 CHAIR RAY: I'm sorry, I thought you were  
17 going to elaborate further.

18 Can we go back to the prior slide before  
19 that? This is no doubt trivial, but in the second to  
20 the bottom bullet, there is apparently an editorial  
21 problem of some kind. Is that 19,800 went to 75,000?

22 MR. LINDGREN: 750,000, three-quarters of  
23 a million.

24 CHAIR RAY: Fine. And on the table then  
25 that you just finished with these open items, I guess

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1 I'm less sanguine about the ideas that these are  
2 merely details to be worked out, and trying to discern  
3 that myself, here. But in any event, I would just  
4 note that these are open items the resolution of which  
5 we can't foresee as we are sitting here now.

6 MR. LINDGREN: Yes. This is a code that  
7 does not have the - do the validation and verification  
8 aspects, and benchmarking.

9 CHAIR RAY: Well, often we do get  
10 involved as you've seen in these kinds of details, and  
11 the adequacy of codes and so on.

12 MR. LINDGREN: An important lesson we  
13 learned here is, do not benchmark your code to a code  
14 that has not been benchmarked. Yes, I guess I have a  
15 lesson learned.

16 CHAIR RAY: Okay, Bill.

17 MEMBER SHACK: But this is your  
18 equivalent to FatiguePro, which we --

19 MR. LINDGREN: Yes.

20 CHAIR RAY: Bill, do you have anything  
21 else?

22 MEMBER SHACK: No, considering the  
23 problems that staff has had with FatiguePro, I'm sure  
24 that they are going through the same kinds of  
25 questions with this version.

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1 CHAIR RAY: Okay, 3.9.2 and 3.9.5 focus  
2 on the reactor internals. 3.9.2 is actually dynamic  
3 vibration kinds of things, and 3.9.5 is the design of  
4 the reactor internals. There was a COL information  
5 item on providing the reactor internals vibration  
6 assessment and the predicted response, once again, as  
7 part of our amendment review we completed that  
8 generically and went to remove that COL information on  
9 it.

10 We completed and evaluation of the core  
11 support material for a COL information item that  
12 focused on void swelling, and similar kinds of effects  
13 on the core support materials. That's another one  
14 that was a COL information item we chose to do.

15 CHAIR RAY: What was that - sorry to back  
16 you up again - but completed action item for COL item  
17 on reactor internals vibration assessment and  
18 predicted response. What did that entail?

19 MR. LINDGREN: Vibration analysis.

20 CHAIR RAY: Just analysis?

21 MR. LINDGREN: Analysis, it predicts a  
22 response - there still is an ITAAC for the first plant  
23 to do a vibration test.

24 CHAIR RAY: There will be special  
25 instrumentation?

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1 MR. LINDGREN: There is special  
2 instrumentation; they're defined in the DCD. The  
3 first unit test. And one of the requirements of the  
4 guidance on this is that you make a prediction first  
5 as to what you are going to see, and then you run the  
6 test and see how accurate your prediction is.

7 That development of that prediction was -  
8 and the certified design was left as a COL information  
9 item, and we have completed it during our amendment.

10 MEMBER ARMIJO: I had a question on your  
11 core support void swelling issue. With the original  
12 DCD. I'm trying to figure out if there is something  
13 that has changed in the design that required  
14 additional analysis?

15 MR. LINDGREN: We did not complete that  
16 analysis in the original certification; it was left as  
17 a COL information item.

18 MEMBER ARMIJO: And now you have  
19 completed that?

20 MR. LINDGREN: We have completed that.

21 MEMBER ARMIJO: What was your finding?

22 MR. WISEMAN: This is Dale Wiseman from  
23 Westinghouse. Basically using screening criteria  
24 developed through the EPRI programs. In the void  
25 swelling area the screening criteria is basically on

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1 temperature and fluids, and none of our core support  
2 structures were outside the screening criteria.

3 MEMBER ARMIJO: What fluence level do you  
4 use as a cutoff point below which you are not  
5 concerned?

6 MR. LINDGREN: It's a combination of  
7 temperature over 608 degrees Fahrenheit I believe, a  
8 little over 600, and 20 dpa for the fluence.

9 MEMBER ARMIJO: Okay, not much happens  
10 there.

11 MR. LINDGREN: As a result of providing  
12 the first item to the staff for review, we revised  
13 some of the discussion about the modeling for the  
14 internal discussion. We added a discussion about the  
15 GAPS in the internals, and pulses from the reactor  
16 coolant pumps, and could finally - those are as a  
17 result of interactions that the staff - and then we  
18 also revised the locations for the vibration  
19 measurement transducers from what we had in the - by  
20 design.

21 MEMBER ARMIJO: This bullet here for  
22 example, it says revised reactor vessel internals  
23 modeling discussion illustrates the difficulty we  
24 have. There is no way of knowing what does that mean  
25 without asking at least one or two questions. You

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1 need to pull the microphone toward you I think.

2 MR. WISEMAN: This is Dale Wiseman from  
3 Westinghouse. Basically the changes here were trying  
4 to enhance the model that we had used previously, and  
5 this is a model integrated model that has four major  
6 component submodels of the vessel, and then you get  
7 into the core barrel, and the core shroud is another  
8 model, and then there is a simplified fuel assembly  
9 model.

10 So the initial analysis that was done only  
11 had three of these models. It was deemed to get a  
12 better response that we needed to add more detail to  
13 the model.

14 Then there was also inclusion in this  
15 model of GAP elements. So this whole system model,  
16 which is what it became known as, the reactor systems  
17 model, was used in the seismic analysis then to  
18 produce loads for all the components in the vessel and  
19 the internals.

20 So these changes are enhancements of the  
21 model in more detail, more rigorous modeling of the  
22 gaps of the various components of the internals.

23 We added neutron panels to the reactor  
24 internals to reduce the fluence on the reactor vessel.

25 In conjunction with that we also increased the

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1 diameter of the reactor vessel, it was two inches on  
2 the diameter, one inch on the radius. Also helped to  
3 reduce the fluence on the reactor vessel. This is  
4 obviously part of our design finalization effort.

5 And we also added the flow skirt that you  
6 heard about yesterday to the lower portion of the  
7 reactor vessel to include the distribution of flow  
8 into the fuel assemblies. As you know this is  
9 supported by testing.

10 MEMBER SHACK: The neutron panel, is that  
11 what we used to call a baffle plate?

12 MR. LINDGREN: No, that's different.  
13 Neutron panels are on the axes here. They are sort of  
14 - you can sort of see them here, sort of a crescent  
15 shape of just extra metal to slow down and grab  
16 neutrons. This design has a core shroud around it,  
17 rather than - well, that is inside the barrel, and  
18 then the neutron panels are attached to the barrel on  
19 the outside of the barrel, in the downcomer between  
20 the barrel and the reactor vessel.

21 A couple of other minor changes was the -  
22 we changed the configuration of the specimen baskets  
23 and then down here the way the lower core plate is  
24 keyed into the reactor vessel change, and then the -  
25 these are the internals, and the flowskirt that ends

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1 up fitting about here, but it is attached to the  
2 reactor vessel.

3 MEMBER ARMIJO: What drove the increase  
4 in the diameter of the pressure vessel?

5 MR. LINDGREN: It was primarily to get a  
6 little more water between the core and the vessel.

7 MEMBER ARMIJO: Just for vessel life?

8 MR. LINDGREN: For the fluence, yes, sir.  
9 It also has the advantage of, it compensated for the  
10 area taken up by the neutron panels, so there was no  
11 question about increasing velocity.

12 MEMBER ARMIJO: The burn panel is just a  
13 piece of steel, just a shield? Or is there anything  
14 special about it?

15 MR. WISEMAN: This is Dale Wiseman from  
16 Westinghouse. The neutron panels are essentially  
17 additional metal added to the core barrel. And as Don  
18 was pointing out they are located where the fuel  
19 assemblies are on the periphery, so that's where you  
20 get the highest fluence. So they are limited to those  
21 areas where the fuel assemblies - periphery.

22 CHAIR RAY: We've got to go back to - I  
23 guess I wanted to ask Sanjoy if this is the point at  
24 which - I'm looking here at this flowskirt, and the  
25 next - is this where we are going to get the thermal

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1 hydraulics issues addressed that you are interested  
2 in?

3 MEMBER BANERJEE: Well, I think that it's  
4 up to them. But probably the effect has to be  
5 discussed on the - whenever they discuss accident  
6 analysis.

7 MR. LINDGREN: You are interested in the  
8 accident analysis?

9 MEMBER BANERJEE: Yes.

10 CHAIR RAY: Not in the mechanical --

11 MEMBER BANERJEE: Well, you know the flow  
12 distribution and the effect on the fuel and so on I  
13 see as more of an operational problem. It's very  
14 important, but it's not really that to us. It's up to  
15 you guys.

16 MR. LINDGREN: That section will be  
17 included when we discussion Chapter 15.

18 MEMBER BANERJEE: In some way though of  
19 course I'd be interested in effects on DNB and full  
20 distribution. But I'm pretty sure that you are not  
21 close to any margins there, because you include in the  
22 full distribution. So you should actually gain margin  
23 on that.

24 MEMBER ARMIJO: I am not familiar with  
25 PWR vessel flowskirt designs. So my question is

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1 pretty simple: is this pretty standard only larger?

2 MR. LINDGREN: It is typical of the CE  
3 fleet.

4 MEMBER ARMIJO: So you've incorporated  
5 that into --

6 MR. LINDGREN: And our internals is a  
7 hybrid of Westinghouse and CE designs. The core  
8 shroud is also typical of the CE.

9 MEMBER BLEY: Just eyeballing it, those  
10 are pretty big holes in that, the holes in the skirt.

11 MR. WISEMAN: This is Dale Wiseman. The  
12 flood holes are about two inches.

13 MEMBER BANERJEE: And typically how many  
14 velocity heads are you losing in terms of head - just  
15 give us a feel for it.

16 MR. MEYER: This is Greg Meyer from  
17 Westinghouse. Just in terms of pressure.

18 MEMBER BANERJEE: Just velocity, just  
19 give it to me in that, I understand that.

20 MR. MEYER: We usually use a coefficient,  
21 conservatively about 1.2. So and that is considered  
22 fairly conservative.

23 MEMBER BANERJEE: Same both ways?

24 MR. MEYER: It's slightly different in  
25 either direction, reason being is the front end is

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1 champfered, the upstream side. The back end is not  
2 champfered. So there is a slight difference because  
3 of that, but it is not large.

4 MEMBER BANERJEE: And all the flow goes  
5 through this?

6 MR. MEYER: There are gaps at the top and  
7 there is a gap at the bottom just for heat, for  
8 expansion that exist. But the flow area there, with  
9 respect to the holes themselves, is very, very small.

10 MEMBER BANERJEE: And these numbers that  
11 you are quoting for the loss factors, is that sort of  
12 consistent with what is found in the CE plants? I  
13 guess people have assessed it since they are being  
14 used.

15 MR. MEYER: It is similar. The CE,  
16 though in philosophy the design is similar, the size  
17 is very different, and some of the design features are  
18 slightly different. But in terms of, we will have  
19 test data that also helps us determine that pressure  
20 loss along with correlation with CFD models as part of  
21 our validation of CMP. So we tell a story if you will  
22 between all three, and it has been consistent.

23 MEMBER BANERJEE: If you get a situation  
24 where you get two-phased flows for this, do you still  
25 keep the same loss factor?

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1 MR. MEYER: I don't want to speak to  
2 that, because I want to say, that is my understanding.

3 I know in some analyses they will do that. But in  
4 terms of a final analysis, I do not know.

5 MEMBER BANERJEE: Would that be part of  
6 your safety analysis?

7 MR. MEYER: That's part of your question  
8 that will be answered.

9 MEMBER BANERJEE: Okay, thank you.

10 MEMBER BLEY: I am just curious, and  
11 maybe this is proprietary stuff you don't want to get  
12 into, but how effective is this flowskirt design in  
13 equalizing the flows and balancing? Is it a big  
14 difference?

15 MR. MEYER: Greg Meyer from Westinghouse.  
16 It turns out to be, from testing and CFD it turns out  
17 to be very effective.

18 MR. LINDGREN: Good enough.

19 MEMBER BLEY: Almost good enough.

20 MEMBER BANERJEE: Now of course you can  
21 ask questions about fretting of the fuel.

22 (Laughter.)

23 CHAIR RAY: Proceed.

24 MR. LINDGREN: Okay. That's all I have  
25 to talk about the internals right now.

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1           3.9.3 talks about ASME code components,  
2 and so some of the piping comes in right here. Here's  
3 your subject: we revised the list of piping lines that  
4 we found to be susceptible to thermal stratification  
5 cycling and striping. These lines are listed in the  
6 DCD, and identified with additional analysis.

7           MEMBER BANERJEE:       What is the table  
8 number? Somebody can give it to me later.

9           MR. SISK:    I believe 3.9-1.

10          MEMBER BANERJEE:    3.9 dash 1?

11          MR. SISK:    3.9- 1. Let me confirm that.

12          MR. LINDGREN:       I have it, but I don't  
13 know if you want me to read off the list.

14                 We added a table of critical piping design  
15 analysis method and criteria for ASME code piping to  
16 capture information that was previously in the piping  
17 DAC. The piping DAC that was certified was a table of  
18 criteria and methods in the introduction to the DCD.

19                 When we proposed to get rid of that, one  
20 of the comments we had from the staff was, that was a  
21 very nice list to have, and that we should try to keep  
22 it somehow, so we added it to 3.9.3.

23                 We added a requirement for snubber  
24 inspection testing on the replacement program. That  
25 is new - it's new to be explicit, as it is. It was

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1 implied before. And that is part of our working on  
2 in-service testing.

3 We had a COL information item that said,  
4 design specs and design reports will be available for  
5 review by the staff, that COL applicants will have  
6 those available by review.

7 We have completed those and the staff gave  
8 an audit of that material. So we have completed that  
9 information item.

10 Okay. What we provided for staff review  
11 were the design specs, and the design reports for the  
12 major components that are specifically designed for  
13 the AP1000 such as the reactor vessels, the generator  
14 and items of those magnitudes. For the components  
15 such as valves and auxiliary equipment that are more  
16 catalogue items we get from vendors, we have completed  
17 the design specifications.

18 There are ITAAC that require design  
19 reports for all the ASME code as built ITAAC stuff,  
20 design reports for all the ASME code versions.

21 So we got rid of that COL information  
22 item. We revised - there was COL information on  
23 benchmarking the piping programs that basically said  
24 if you use piping program that isn't listed in the DCD  
25 you have to undergo a benchmark program. Since we

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1 were doing piping design, and used the ones we said -  
2 we talked about in the DCD, we did not have to do  
3 those benchmark programs. We revised that COL  
4 information.

5 MEMBER BANERJEE: 3.9-1 is not the right  
6 table.

7 MR. SISK: I'm checking it now.

8 MR. LINDGREN: It's not really a table.  
9 It's text in the DCD.

10 MEMBER BANERJEE: It's a list?

11 MR. LINDGREN: It's a list in the DCD.

12 MEMBER BANERJEE: You can do it offline.

13 MR. LINDGREN: Sorry. The open items in  
14 this as part of the review of the specifications and  
15 design reports, the staff had comments about the way  
16 we evaluated the J-groove weld. There was a  
17 disagreement between the staff and Westinghouse on how  
18 we applied certain ASME code reviews.

19 We have decided to follow the NRC staff's  
20 interpretation using the plastic analysis on that  
21 weld, and sent in a revised RAI response and the  
22 analysis is available for review by the NRC.

23 MEMBER ARMIJO: Now was that an analysis  
24 that had not been completed in the initial DCD in the  
25 certified design?

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1 MR. LINDGREN: We had not done it.

2 MEMBER ARMIJO: You had not done it?

3 MR. LINDGREN: We had not done a detailed  
4 stress report of the - it turns out this is the  
5 attachment of the CRM nozzles to the head.

6 MEMBER ARMIJO: Right. It didn't change  
7 the design at all, right?

8 MR. LINDGREN: We get a little higher  
9 stress in this one?

10 MEMBER ARMIJO: I was just curious to  
11 find out. When does the DCD, the certified design,  
12 when does it get opened up? If the design hasn't  
13 changed, and you already did this analysis, why would  
14 you have to do it again?

15 MR. LINDGREN: We are in fact not  
16 changing anything in the DCD for this. This was as a  
17 result of our effort to close the COL information  
18 items that provide the reports for our review. When  
19 they review one of the reports they found this the way  
20 we had done - did not agree with the way we had done  
21 the J-groove weld.

22 MEMBER ARMIJO: So is this a COL open  
23 item or a DCD --

24 MR. LINDGREN: Well, no since we chose to  
25 close that COL information item, it became our open

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1 item. We believe we have now responded to it in a way  
2 that will close it.

3 MS. MCKENNA: Mr. Lindgren, I think at  
4 the time of Rev 15 it was not finished as a part of  
5 design certification, because it was a COL information  
6 item instead of design specification reports. Now  
7 that work has been done; those reports have been  
8 developed in order to resolve this information item in  
9 the certification, and that is how we have this  
10 opportunity if you will for the staff to review these  
11 reports which didn't exist at the time of Rev. 15.

12 MR. LINDGREN: Second open item --

13 CHAIR RAY: Sanjoy, do you want to take  
14 note of this open item here he is about to describe?

15 MEMBER BANERJEE: Yes, yes, but we are  
16 going to deal with it in a different meeting, right?

17 MR. LINDGREN: Well, this open item  
18 focuses particularly on the component designs of the  
19 screens if you will. The design specifications,  
20 seismic qualifications. They are --

21 CHAIR RAY: Well it's debris-loading  
22 stresses too, isn't it?

23 MR. LINDGREN: What's that?

24 CHAIR RAY: Debris-loading stresses too,  
25 isn't it?

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1 MR. LINDGREN: Stresses on the screens.  
2 From any source. So this is focused on the screens as  
3 a component, not how they work in the system, but are  
4 the screens strong enough to handle the differential  
5 pressure and seismic loads and that type of thing.

6 MEMBER BANERJEE: What type of screens  
7 are these?

8 MR. LINDGREN: They are pockets.

9 MEMBER BANERJEE: Pocket screens?

10 MR. LINDGREN: They are basically pockets  
11 with screen material on all five sides.

12 MEMBER BANERJEE: If you just tell me  
13 they had the standard pockets - is this CCI or who  
14 does that?

15 MR. LINDGREN: Yes.

16 MEMBER BANERJEE: CCI, right?

17 MR. LINDGREN: That is correct. They are  
18 our vendor on this.

19 So the staff did a review of the design  
20 spec. Did a review and had some questions and were  
21 looking for some more information. We are pulling  
22 that information together.

23 MEMBER BANERJEE: Does the plant have any  
24 fiber?

25 MR. LINDGREN: That's really --

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1 MEMBER SHACK: You said no before.

2 MR. LINDGREN: I said we had no fibrous  
3 insulation. That's really a Chapter 6 question.

4 MR. CUMMINS: The fiber that we have is  
5 from residual debris, dirt. So we have the inlets for  
6 that.

7 MEMBER BANERJEE: This should be a super  
8 clean plant, right?

9 MR. CUMMINS: Yes, it is going to be a  
10 super clean plant.

11 MR. LINDGREN: We have some drawings and  
12 documents that we are preparing. What we do is, we  
13 place them in our Rockville office and so the staff  
14 can review them there, and not have to travel to  
15 Pittsburgh to look at them.

16 MEMBER BANERJEE: But to answer Harold's  
17 sort of issue that the loading due to the debris could  
18 form a fiber mat, would be quite high in terms of the  
19 pressure losses; otherwise it may not. We will  
20 revisit that.

21 CHAIR RAY: Yes, I think the point would  
22 be, in my mind anyway, are they effective in  
23 performing their function of capturing the debris and  
24 not having it break through and go on into the  
25 recirculating stream.

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1 MR. LINDGREN: That is really a Chapter 6  
2 question, the performance of the streams. This  
3 particular review looked at the control and mechanical  
4 capability.

5 MEMBER BANERJEE: Well, the stream is  
6 placed at the periphery of the containment, a little  
7 like in Salem, or how is it?

8 MR. LINDGREN: It's basically a structure  
9 that is vertical near the bottom of the containment,  
10 and the pipes that allow recirculation are open on the  
11 other side. This is really a Chapter 6.

12 CHAIR RAY: Yes, I would prefer we have  
13 the right people here for the Chapter 6.

14 MEMBER BANERJEE: Do you have a schedule  
15 for that?

16 MR. CUMMINS: This is Ed Cummins. On the  
17 GSI-191, the special list will include it in November.

18 MR. SISK: There is plan to have a  
19 discussion in November.

20 MR. CUMMINS: But what he is after, what  
21 he wants to hear, is going to be scheduled in  
22 November.

23 MS. McKENNA: Yes, I think the idea is  
24 that we have proposed that Westinghouse would present  
25 to the committee in November what they have done to

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1 address GSI-191 in terms of screens, testing,  
2 analysis, that kind of thing. The staff at that point  
3 will not have finished its review, because some of  
4 that work is things that are still coming to us. So  
5 the staff would be presenting its conclusions at a  
6 later ACRS meeting, but this would give you an  
7 opportunity to get some answers to some of the  
8 questions that you are asking.

9 MEMBER BANERJEE: We understand that  
10 there would be like in GSI-191 likely to be some  
11 issues with downstream effects. For example, not  
12 really going to be closed out until we actually review  
13 the downstream effects program.

14 MR. SISK: The plan, as I think Eileen  
15 and Ed were referring to is that we would come in at  
16 the next ACRS meeting in November and talk about the  
17 GSI, both from the sump screen aspects and the  
18 downstream effects, basically how AP1000 or how  
19 Westinghouse is resolving the issue of GSI-191, sump  
20 screen downstream effects for AP1000 in the November  
21 timeframe.

22 Then I think the schedule of that in  
23 January, there is a follow on staff would have a  
24 discussion for the SER Chapter 6. But we are looking  
25 forward to our discussion and answering many of your

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1 questions I hope.

2 MEMBER BANERJEE: And you will not be  
3 able to close this until - I don't know, but as you  
4 know there is a lot of work going on on downstream  
5 effects by the industry group. And we are expecting  
6 to see resolution of that maybe mid-year about next  
7 year. So I'm not sure that the item can be closed out  
8 until we have all this data looked at. Because a lot  
9 of the plants are going to do this by reference. So  
10 if you look at the concept of putting new screens,  
11 they will simply do it by reference to the industry  
12 group that is approved.

13 MR. SISK: Yes, and Westinghouse is  
14 following the industry programs. Westinghouse is also  
15 working with the owners group on the operational side  
16 of the resolution to GSI-191. And we are looking at  
17 what they are doing and what we are doing and how the  
18 industry would --

19 MEMBER BANERJEE: For the existing plants  
20 there is a clear procedure for closing out each,  
21 right? I mean we have the IRT going on. We've got a  
22 representative - an expert sitting back there. So is  
23 it that the staff are actually going to close it out  
24 in the same way for the new reactor? How are you  
25 going to close it out? Are you going to have an IRT

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1 sort of resolution of this? What is the - that's an  
2 integrated review team.

3 MR. LU: This is Shanlai Lu from the  
4 staff. I don't think I'm going to address the GSI-191  
5 downstream effects. That's for the reactor system  
6 review. I just switched to the division of  
7 engineering at the active branch chief on the AP1000  
8 on structure side, so I am not ready to address your  
9 comments or questions.

10 MEMBER BANERJEE: But you will do  
11 something about it, right?

12 MR. LU: Yes, definitely if there is a  
13 desire. MEMBER BANERJEE: But I am  
14 really asking about the procedure. Because on the  
15 operating reactor side there is a clear procedure to  
16 close out each plant, which ends up as an integrated  
17 review team and looks at all the things, and takes  
18 account of this. Each plant is closed out.

19 Now with this design certification process  
20 is there something similar going to occur with this or  
21 not?

22 MS. MCKENNA: I don't know if there is  
23 such as thing as an IRT. I think we have a number of  
24 technical staff who are responsible for various  
25 aspects of the sump review, for example, how does the

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1 debris move through the containment, what happens to  
2 the screens, what happens to the fuel. And we have  
3 representatives from each of those that are working  
4 together as a team, and the goal is to write a safety  
5 evaluation which discusses how the AP1000 design deals  
6 with this issue. And hopefully we will come to the  
7 conclusion that they've demonstrated that the core's  
8 long-term cooling is satisfied. So I think that is  
9 the approach.

10 MEMBER BANERJEE: But this is really just  
11 a side conversation that we want to maybe resolve at  
12 the next meeting or the meeting after. But do you  
13 really expect that you will be able to close out the  
14 issue until we have the industry work on downstream  
15 effects completed, reviewed and approved? Hopefully  
16 it'll be approved, because at that point it will be  
17 used by reference by most of the existing plants. So  
18 how are you expecting to close it out in January, when  
19 we don't expect it for the existing plants to be  
20 closed out before late next year?

21 MS. DIXON-HERRITY: My name is Jennifer  
22 Dixon-Herrity. I'm the chief of the engineering  
23 mechanics branch two. I've been involved with this  
24 review. Our group looks at generically across the  
25 board the way that the components are designed. We

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1 would go through and review the design specs and  
2 design reports for these screens, and if they are  
3 designed in accordance with the regs, and in  
4 accordance with the code that they've signed up to  
5 meet, and in accordance with the DCD, then we could  
6 close this item out.

7           However, later on in the process, we have  
8 ITAAC in place that would look at as-built  
9 reconciliation. So anything that is changed in the  
10 design would have to be changed in the design report  
11 later; they will have to reconcile it. We would have  
12 the opportunity to look at that later as part of the  
13 inspection process.

14           MEMBER BANERJEE:           The thing that's  
15 concerning me is that I'm sure that structurally and  
16 so on this is okay. The job - whether it really does  
17 its job or not is what is in question: function. In  
18 this case the function is to take out the debris and  
19 make sure you don't clog the core. How are you going  
20 to assure yourself that that function is taken care  
21 of?

22           MS. DIXON-HERRITY:        I think that that is  
23 the Chapter 6 review that Shanlai was talking about.

24           MEMBER BANERJEE:        So that's the crux of  
25 the matter.

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1 MS. MCKENNA: Certainly. Our staff is  
2 working very closely with the NRR staff to understand  
3 where they are in the review. There are some  
4 differences in the design, flows and things like that,  
5 which may lead us to parallel but on a different  
6 timetable for conclusion. But obviously we are aware  
7 of what's going on on the owners' group side and what  
8 that means for the AP1000.

9 MEMBER BANERJEE: I'm just skeptical that  
10 you can close it out from a functional point of view  
11 until the downstream effects are resolved for the  
12 existing plants. At that point, of course, you can.  
13 But I think it will be later in the year. So to be  
14 realistic, it may remain an open item.

15 MS. MCKENNA: It could. I mean I'm  
16 certainly not going to prejudge, the staff hasn't  
17 finished its review.

18 MEMBER BANERJEE: All right, okay.

19 CHAIR RAY: Do we need to pursue this any  
20 further right now?

21 MEMBER BANERJEE: No.

22 CHAIR RAY: There is an open item on the  
23 structural thing. I'm not concerned about the  
24 downstream, and I'm less sanguine about the structural  
25 adequacy until I know more about the open items. So

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1 when the staff comes up, can you discuss a little more  
2 what the heck the issues are that are at play that  
3 give rise to this open item?

4 MS. McKENNA: Yes.

5 CHAIR RAY: Thank you.

6 MR. LINDGREN: Let me just complete the  
7 mechanical portion of this, these screen pockets are  
8 combined into modules that are oriented horizontally  
9 and they are put into a frame. That's what this open  
10 item addresses. It's drawing that show that, and  
11 documents that show the loads on those.

12 Now we are preparing those documents to be  
13 available for the staff to review, with the caveat  
14 that the ongoing testing if there is some - if there  
15 becomes a difference in the pressure loss to the  
16 screens, this information will change. But it's the  
17 best we have available right now.

18 CHAIR RAY: So the issues have to do with  
19 the completion of these remaining details?

20 MR. LINDGREN: Right.

21 CHAIR RAY: There's been some  
22 controversy.

23 MR. SISK: And it's just we did not have  
24 the drawings. We gave them to a vendor, and we have  
25 them now.

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1 CHAIR RAY: We're going to show the J-  
2 groove slide, and then we are going to stop and have a  
3 break; it's now a half-hour late. So proceed.

4 MR. LINDGREN: This is the J-groove  
5 weld, just so you know what we're talking about. That  
6 is the pipe that is the nozzle that goes to the  
7 reactor vessel head, attached to the CREMs. So that  
8 the - what you see at the bottom of the screen, at the  
9 bottom of the picture is the cladding of the reactor  
10 vessel head, and then there is this vaguely J-shaped  
11 weld that attaches this nozzle into the reactor vessel  
12 head.

13 And there was - I'm not even going to try  
14 to describe it - a difference of opinion. I'd just  
15 note that to resolve it we are doing a plastic  
16 analysis that satisfied the requirements.

17 MEMBER ARMIJO: Was this an old  
18 requirement or a new requirement?

19 MR. WISEMAN: This is Dale Wiseman from  
20 Westinghouse. The requirement has always been to meet  
21 the code. And the analysis in the interpretation of  
22 the code that Westinghouse used to show that it met  
23 the code, the staff did not agree with that  
24 interpretation of the code.

25 MEMBER ARMIJO: Wasn't that resolved in

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1 the initial certified design of the AP1000?

2 MR. LINDGREN: We had not completed the  
3 design.

4 MEMBER ARMIJO: It wasn't completed, so  
5 it was an open issue for the amendment.

6 MR. WISEMAN: This was part of the COL  
7 item that we were talking about producing the design  
8 reports for the major components. So this was - so  
9 this analysis was part of trying to close that COL  
10 item.

11 CHAIR RAY: Okay. We'll pick up with the  
12 Westinghouse presentation --

13 MR. SISK: If I may, sir?

14 CHAIR RAY: Yes.

15 MR. SISK: I just wanted to get back to  
16 while we were on the record, I would like to correct  
17 my statement about the Table 3.9.1 You may want to  
18 check the list that is provided on 3.9-50, and also  
19 look at the table that is 3.9-19. Between the two of  
20 those, if they do not answer your question please let  
21 me know.

22 CHAIR RAY: All right, so we will pick up  
23 with 3.9.4 at 20 minutes to 11:00. It's 14 minutes by  
24 my calculations, which I think we need to trim the 15  
25 by at least one.

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1 (Whereupon, the above-entitled matter went  
2 off the record at 10:25 a.m. and resumed at 10:38  
3 a.m.)

4 CHAIR RAY: Okay, picking up again with  
5 Section 3.9.4.

6 MR. LINDGREN: Okay, 3.9.4 there are  
7 some fairly minor changes - we changed the material of  
8 the gray rod assemblies. We did have a design that  
9 included 24 steel rodlets. We now include 12 silver-  
10 indium-cadmium rodlets and 12 stainless steel rodlets  
11 in a cluster, with reduced diameter compared to a  
12 regular control rod. The gray rods are the rods we  
13 use to affect changes, small changes, to compensate,  
14 to burn up without greatly cycling the boron  
15 concentration.

16 CHAIR RAY: They're also used for load  
17 tolerance, aren't they?

18 MR. LINDGREN: They can be used for load  
19 tolerance, yes.

20 MEMBER ARMIJO: Now why did you do that?  
21 Is there something different in the core that drove  
22 you to go to the silver indium?

23 MR. SISK: No, we did have the silver-  
24 indium-cadmium in Rev 15, and we used the silver-  
25 indium-cadmium obviously in 16 and 17. What they did

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1 was just used it a little broader. In the original  
2 the silver-indium-cadmium was in four rodlets. We now  
3 put it in 12 rodlets. What that does is distribute  
4 the absorbent more evenly around the core and gives  
5 you a flatter flux.

6 MEMBER ARMIJO: This is just a  
7 refinement?

8 MR. SISK: That's all it is.

9 MEMBER ARMIJO: Okay, so it was nothing  
10 that - no fundamental change in the core that drove  
11 this change?

12 MR. SISK: Nothing fundamental. The  
13 other thing we are really looking at here was the use  
14 of the gray rods. These were not changing the black  
15 rod RCCA type - what we call the gray rod, which are  
16 used a little bit for the reactivity control, flux  
17 control, throughout the reactor. But that gets into  
18 current design, and it's just a matter of trying to  
19 have it a little bit smoother distribution across the  
20 board.

21 MEMBER ARMIJO: Okay, thank you.

22 MR. LINDGREN: We made a small revision  
23 in the description of how we would draw and insert the  
24 control rod to reflect that we have two coils holding  
25 it in place. And then we revised the cycling support

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1 for the CRDM rod drive mechanism when we changed the  
2 integrated head package. Previously we had a plate at  
3 the top that - at the top of the rod travel housing.  
4 When we changed this, the integrated head package  
5 design, we changed the design with a bumper that  
6 flipped over the rod travel housing similar to what we  
7 have in many operating plants.

8 That's really all I have on the control  
9 rod drive.

10 CHAIR RAY: Okay, proceed.

11 MR. LINDGREN: We have no open items.

12 We had a fairly significant change in the  
13 integrated head package. Integrated head package is a  
14 design that decreases the time to prepare for  
15 refueling. It allows you to take pretty much  
16 everything that is attached to the head, reactor  
17 vessel head, off at one time. We redesigned the in-  
18 core instrumentation support system. We had a design  
19 where everything was drawn up into the - above the  
20 reactor vessel head. We - that resulted in putting a  
21 large radiation source in the head when we were moving  
22 it, and when we get to the final location, you push  
23 them back down into the tank water.

24 We put in the design that is similar to  
25 some that are included in the CE fleet that we used to

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1 call a Quick Loc design so that the instrumentation is  
2 only drawn up into the top of the upper terminals,  
3 they're not brought up all the way out of the reactor  
4 vessel. The Quick Loc design is a design that has  
5 been used before. We reduced the radiation exposure.

6 The highly irradiated instrumentation remains under  
7 water, so you observe great improvement to the people  
8 worried about exposure to the people in the  
9 containment.

10 The cooling fans are - this allowed us to  
11 reduce the weight of the shroud, since the shroud was  
12 providing shield. We reduced the weight of the  
13 shroud; that allowed us to put the cooling fans on the  
14 integrated head package, and still be under the weight  
15 of the floor crane lift limits.

16 We revised the seismic support of the CRDM  
17 rod drive housing, and we included a cable bridge that  
18 supports powering instruments.

19 MEMBER ARMIJO: This is really a brand  
20 new design, then, that picked up some features.

21 MR. LINDGREN: It is considerably  
22 different than what we had before. It does still have  
23 many of the features. It still has a shroud, and the  
24 shroud has openings near the bottom so you can do  
25 inspections at the top of the reactor vessel head.

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1 MR. WISEMAN: This is Dale Wiseman from  
2 Westinghouse. The integrated head package design as  
3 it now exists is very similar to ones that we have  
4 placed in operating plants as replacement head  
5 simplifications.

6 MEMBER ARMIJO: Oh, okay.

7 MR. LINDGREN: We have a picture of the  
8 piping here. You see the fans are attached to it.  
9 There is a cable bridge that brings the cables over to  
10 a connector plate to increase how fast one can  
11 disconnect. One difference from Westinghouse fleet  
12 of operating clinics is that the instrumentation does  
13 come out of the top of the head on this system.

14 So this is a change from Revision 15. The  
15 overall height was also reduced. We don't have to  
16 have the height reduced the full length of the  
17 instrumentation.

18 Okay, 3.10 which is seismic and dynamic  
19 qualification, we added some additional information to  
20 show the - to explain what we meant by qualification  
21 by analysis. We deleted the option of qualification  
22 by experience . That was -- and therefore we  
23 eliminated a COL information item on qualification by  
24 experience.

25 The reason we made these changes -

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1 qualification by experienced approved in DCD Rev 15,  
2 but it was approved on a level that I'd call  
3 theoretical. The COL information item said, tell us  
4 how you are going to do this. In attempting to tell  
5 the staff - this was yet another COL information item  
6 we wanted to close in design certification, and we  
7 discovered that when we wanted to show how this works  
8 in practice, that it's not as capable as it was in  
9 theory. The staff had problems with what we suggested  
10 we were going to do to implement the qualification by  
11 experience. We made the determination that it  
12 probably was not a large benefit and decided to  
13 eliminate that option.

14 MEMBER BLEY: Was this for structures?

15 MR. LINDGREN: No, it's mostly the pipe,  
16 the valve operators.

17 MEMBER BLEY: And so you are qualifying  
18 by design and not be test.

19 MR. LINDGREN: Qualifying by analysis is  
20 large mechanical - like steam generators and reactor  
21 vessels.

22 MEMBER BLEY: Right, that's why I'm a  
23 little confused.

24 MR. LINDGREN: We had a description by  
25 analysis that was sketchy I would guess. And we've

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1 added information to clearly define when we use it and  
2 how we use it.

3 The qualification by experience, we were  
4 not attempting to use earthquake experience but rather  
5 testing experience in similar designs. And ultimately  
6 we could not come to an acceptable definition of what  
7 a similar design means or a similar test. So we are  
8 qualifying - these are things like valve operators,  
9 electronics, those are the ones that are typically  
10 qualified by testing, and they will continue to be  
11 qualified by testing. As I said we eliminated the  
12 qualification by experience.

13 MR. CHEN: This is Pei-ying Chen, NRC.  
14 I guess basically qualification by experience, they  
15 are following that you assign A46 concept trying to  
16 use the testing experience and then qualify. But  
17 Westinghouse produced a topical report, TR-16, initial  
18 report, staff review. However, after we raised a  
19 dozen questions, Westinghouse decided to withdraw that  
20 topical report, and therefore they tried not to use  
21 the experience.

22 MEMBER BLEY: And you are happy with what  
23 they did?

24 MR. CHEN: No, I said they withdraw the  
25 topical - oh they are using the other method, which

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1 you know is credible through IEEE's report.

2 MR. LINDGREN: And then finally we  
3 identified additional information to address screening  
4 and qualification of equipment for high frequency  
5 motions. High frequency seismic motions is something  
6 we're not really talking about much in this session.  
7 It shows up in 3.7 and 3.8, but we have to address the  
8 seismic dynamic qualification for sites that have high  
9 frequency motions. And it is consistent with the  
10 screening and qualification guidelines in the Interim  
11 Staff Guidance, ISG-01.

12 MEMBER BLEY: Since you brought up  
13 seismic --

14 MR. LINDGREN: Go to the next one.

15 (Laughter.)

16 MEMBER BLEY: I want to slip in a  
17 question I didn't ask this morning earlier when you  
18 talked about seismic. Some of the changes you've made  
19 in seismic design, you mentioned in the turbine  
20 building now in seismic two you worried about the  
21 proximity of non-seismic and seismic, two things to  
22 the seismic one. And I just went back and looked  
23 through a description of the PRA in Chapter 19, and  
24 the seismic margins analysis there, and the only place  
25 I see any mention of worrying about the category two

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1 or non-seismic category one is in the description of  
2 the turbine building, and of course that's changed.

3 MR. LINDGREN: It says it's not seismic,  
4 doesn't it?

5 MEMBER BLEY: Yes, it does. Now you  
6 haven't updated the PRA to account for these changes,  
7 and I'm a little curious about why that is. Then you  
8 replace these intentionally blank sections in that  
9 document - this might not be the right time to ask  
10 about this - it says, the design certification of the  
11 AP1000 included consideration by the NRC of the topic  
12 referred to in this empty section. That seemed a  
13 little weird to me. But the PRA was not updated to  
14 account for the changes in seismic design it appears.  
15 There is no mention of any changes.

16 MR. CUMMINS: This is Ed Cummins. We  
17 have an RAI on seismic margins. It's a little broader  
18 than just your comment, and we have a plan schedule  
19 for submitting updated information on seismic margins  
20 for I think December, although I'm not sure of the  
21 schedule.

22 MEMBER BLEY: We'll wait for that. I  
23 didn't see any thing in the old margins analysis that  
24 talked about the possible impact of non-seismic and  
25 category two things on seismic category one which

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1 would have been analyzed in the margins analysis. So  
2 we'll ask about that when you come back on that one.

3 MR. LINDGREN: We are done with 19, but  
4 we are coming back with seismic.

5 CHAIR RAY: Done is not the right word in  
6 this context. But we have gone through 19.

7 MS. McKENNA: Recall that second question  
8 about the intentionally blank pages.

9 MEMBER BLEY: Yes.

10 MS. McKENNA: That was really a  
11 reflection of some changes that occurred that at the  
12 time of the initial certification the PRA was  
13 submitted as a stand-alone document to go along with  
14 the design certification. Subsequently there was a  
15 change to Part 52 that says you don't submit the PRA;  
16 you include the results, and information about the  
17 PRA, in the design certification documents.

18 This was an attempt to kind of bridge  
19 that. Things were not put in the DCD because they  
20 were over in the PRA, but now we don't have the PRA as  
21 part of the package, so we needed to have something in  
22 the DCD to reflect what that information was. So it's  
23 a little bit perhaps muddy, ambiguous wording, but  
24 that was the purpose.

25 MEMBER BLEY: You looked at what it

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1 really was.

2 MS. MCKENNA: Yes, that's right, that  
3 subject matter was looked at as part of the PRA, so it  
4 was an attempt to deal with a change in that  
5 requirement.

6 MR. LINDGREN: Okay, this slide here  
7 shows in blue - on your paper it's black on black, on  
8 this screen I think it's blue. It's generally the one  
9 that's lower. We referred to that as our hard rock  
10 high frequency specter. It bounds three of the COLA  
11 applicants for AP1000 sites. It - we are the  
12 beneficiary of a lot of work done by the Seismic  
13 Issues Task Team run through NEI to address these high  
14 frequency seismic motions.

15 The general consensus is that these high  
16 frequency motions don't put much energy into  
17 structures, equipment and systems, and that if you are  
18 designed for the more traditional frequency spectrums  
19 then you can handle these larger - these higher  
20 frequency motions.

21 In 3.10, which is the seismic  
22 qualification, it's basically a screening test, so  
23 screening is a two-part title. I mean we look at - we  
24 determine equipment that is potentially sensitive to  
25 high frequency motions. The classic example is

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1 relays, which may be subject to chatter. But there  
2 are others that may be sensitive. They tend to be  
3 electronic devices. And any that we think are  
4 potentially high frequency sensitive, as part of our  
5 standard seismic qualification, we will do a screening  
6 test with high frequency motions to verify that they  
7 are not high frequency motions.

8 Our position is that we will not have any  
9 equipment that is susceptible to high frequency  
10 excitation, that if the screening test finds something  
11 that is, we will select different equipment, redesign  
12 it, or redesign the supports; but we will not have  
13 equipment that is susceptible to high frequency  
14 motion. That is a topic that was of considerable  
15 interest in the past couple of years.

16 We are now done with the V&V portion.

17 CHAIR RAY: On our list it had indicated  
18 you would do 3.12.

19 MR. LINDGREN: 3.12 was buried in the  
20 piping. I put it out of order.

21 CHAIR RAY: That's all right. So in  
22 accordance with the plan we're running about an hour  
23 late but otherwise fine. The - we will now revisit  
24 the topics you've covered with the staff. I want to  
25 give everybody a head's up to one other thing that we

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1 will be doing today that is not on the agenda, and I'm  
2 not sure where to fit it in, but I'm not going to do  
3 it right now because of the desirability of getting on  
4 to the staff, but we received some input on Chapter 8  
5 from one of our colleagues who wasn't able to be here  
6 yesterday or today, and I'm grateful to Member Bley  
7 for having looked at that quickly this morning. We  
8 want to note a few items just for the record. I  
9 understand we wouldn't have the right people here to  
10 respond, but as long as you are up this afternoon we  
11 will take note of a few items. But Dennis has  
12 identified in this input that we received.

13 MS. MCKENNA: Excuse me, Mr. Ray, later  
14 in the day when we were talking about the last item,  
15 3.6, 3.9 and 3.11 we didn't think our engineering  
16 people were going to be there to support that portion  
17 of the discussion today, so we would have staff  
18 available at that point in time. So that might be a  
19 better opportunity.

20 CHAIR RAY: And that is precisely when,  
21 Eileen?

22 MS. MCKENNA: The session that is 3.6,  
23 3.9, and 3.11.

24 CHAIR RAY: Item seven on this agenda.

25 MS. MCKENNA: That's correct.

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1 CHAIR RAY: We covered a lot of the  
2 things John raised yesterday, but there are a few.

3 MS. MCKENNA: Okay, that way you could  
4 have the staff in the room and could hear it directly.

5 CHAIR RAY: Very good. So we will do it  
6 by that time.

7 (Off the record comment.)

8 CHAIR RAY: All right, with that anyway  
9 we will move directly and ask the staff to take the  
10 table for the purpose of their presentation.

11 MS. MCKENNA: There are a number of staff  
12 we thought we might bring up, the people doing 3.2 and  
13 3.6, to the table, cover their topics, and then they  
14 can finish with 3.9. And that also might be,  
15 depending on the questions, might be a good point for  
16 lunch as well after 3.2 and 3.6.

17 CHAIR RAY: Well, we'll definitely do  
18 that, whether they're done. If they are not done  
19 we'll stop and take a break for lunch. But we will  
20 see how it goes.

21 NRC CHAPTER 3 DSER/Ols - Sections 3.2, 3.6,

22 3.9.1-3.9.5, 3.10, 3.12

23 MR. McNALLY: Okay, I'm Richard McNally.  
24 I'm from EMB, Engineering Mechanics Branch, and I'm  
25 here to talk about 3.2, the equipment, classification,

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1 and quality group classification. This covers both  
2 seismic and quality group.

3 And first of all I'd like to say why this  
4 is so important. The seismic and quality group  
5 classifications determine the level of design detail  
6 and basic design requirements that are going to be  
7 imposed during the detailed design. I would really  
8 characterize our review as fairly comprehensive. We  
9 not only looked at the changes that were proposed by  
10 Westinghouse in amendments 16 and 17, but we also  
11 looked for things that we expected to be there that  
12 were concerns or omissions.

13 We also performed an on-site review of  
14 Westinghouse detail design documents that were not  
15 included on the docket, in order to take a look at the  
16 level of detail that we thought was appropriate. And  
17 I'd also like to say that I would really characterize  
18 this not so much as a counterpoint to Westinghouse's  
19 presentation as looking at the issues at a level of  
20 detail presented in the application as well as a level  
21 of design completion that we would be expected to  
22 review during the detailed design.

23 These are really the five areas that we  
24 tended to gravitate toward, which are really  
25 represented by open items in the current safety

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1 evaluation. The first issue that deals with augmented  
2 seismic requirements for the regulatory treatment of  
3 non-safety systems, which we refer to as RTNSS and  
4 those SSCs.

5 And the basic GDC-2 is what establishes  
6 the criteria for important safety and SSCs that shall  
7 be designed to withstand earthquakes. To the extent  
8 that non-safety related SSCs are seismically qualified  
9 as defined by the RTNSS as described in the PRA  
10 Chapter 19 is evaluated in Chapter 22, and - but there  
11 is really no dynamic qualification of active equipment  
12 is considered necessary for RTNSS SSCs; that was  
13 established by commission decision.

14 In response to RAIs, the RTNSS ancillary  
15 diesel generators, as Westinghouse mentioned, are now  
16 included in the amendment, and are located in a  
17 seismic category two building with seismic category  
18 two anchorage, which is acceptable on the basis of  
19 that commission paper.

20 CHAIR RAY: Now is that something that  
21 happens after the certification of the Rev 15?

22 MR. McNALLY: That happened back in the  
23 '80s. That had always existed. The issue as we  
24 talked about before was that these were not classified  
25 as anything in the application. The ancillary diesels

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1 were always there in the design, but there was no  
2 classification assigned to them.

3 CHAIR RAY: Was that an oversight in the  
4 certification?

5 MR. McNALLY: Yes.

6 CHAIR RAY: Okay.

7 MR. McNALLY: The applicant considers  
8 seismic classification of SSCs to be complete, but if  
9 design finalization identifies change, the design  
10 change process should identify changes that would  
11 impact the detailed application in regard to  
12 classifications. That shows that the design is still  
13 evolving.

14 Seismic requirements if needed to support  
15 functionality are to be better defined for RTNSS SSCs.

16 Right now the focus for seismic consideration for  
17 RTNSS-type components is with the Criterion B, post-72  
18 hour functions, and the emergency diesels - I mean the  
19 ancillary diesels, would be ones that are included in  
20 that definition. Right now the only seismic  
21 requirement that pertains to that is anchorage and  
22 seismic category two definitions. Seismic Category II  
23 by itself does not ensure functionality, so if these  
24 diesels are needed after a seismic event to be  
25 functional, then they should have augmented

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1 requirements that apply to them. You may not need a  
2 dynamic qualification but you could require a more  
3 detailed dynamic analysis.

4 Another approach would be to replace the  
5 diesels if they would be damaged in a seismic event.  
6 So we are trying to work out the details of the  
7 seismic requirements with Westinghouse. Some of these  
8 may be ironed out in the detailed design documents.  
9 Some of the RTNSS requirement documents, or possibly  
10 the design reliability assurance program. This may  
11 result in a feature change to the DCD in order to make  
12 it more clear what the exact seismic requirements are  
13 for diesels and other RTNSS equipment.

14 Another open item that we identified was  
15 related to the first item concerned the scope of the  
16 SSCs that were included in the classification tables.

17 During Amendment 16 we selectively included items  
18 that we expected to be on the list. As we identified  
19 the ancillary diesels were an example of something  
20 that was not there. Fire protection classifications  
21 were not there. RPV insulation was not classified as  
22 well as electrical instrumentation type components  
23 were not included in the tape.

24 These are somewhat contained in Section  
25 3.11 for environmental qualification, but no seismic

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1 designation is really assigned to those components in  
2 3.2. So that is a thing that we'll have to work out  
3 with Westinghouse.

4 And then in Amendment 17 we did add the  
5 ancillary diesels but not the other components, RPM  
6 insulation, the circulating water system, which may be  
7 considered site specific. But none of these  
8 components are really classified in the DCD rather  
9 than in the COL applications.

10 So again this is a situation where staff  
11 is going to work out the detailed requirements with  
12 Westinghouse when we do reviews of their non-docketed  
13 type information. Some of the information that we  
14 have looked at already is really in topical reports,  
15 but we haven't totally endorsed those topicals at this  
16 point.

17 Another thing we looked at that we felt  
18 was not sufficiently addressed was augmented QA  
19 requirements for Seismic Category II SSCs. This is  
20 something that is in Reg. Guide 1.29. It's a  
21 regulatory position that the applicant has said they  
22 conform to, but when you look at the classification  
23 tables, there is really no augmented requirements to  
24 distinguish Seismic II SSC quality requirements from  
25 other normal non-important to safety equipment. So we

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1 felt that there should be augmented requirements  
2 imposed on that. And this is something we would look  
3 at doing onsite reviews of design specifications and  
4 other topical type reports.

5 Another item that we focused on is the  
6 list of SSCs needed for continued operation following  
7 an DBE. This is something that's in the Standard  
8 Review Plan, 3.2.1. It's something that Westinghouse  
9 felt they did not need to address initially because it  
10 was not included in the version of the SRP that they  
11 used for preparing the design control document. But  
12 they agreed in an audit that this is something they  
13 would respond to. So we did issue an RAI. We are  
14 still waiting for the RAI response, and the list of  
15 these components is really needed more for pre-  
16 earthquake planning than it is for design purposes,  
17 but that list is something that the SRP infers we  
18 need, so hopefully that will be resolved with the RAI  
19 response.

20 The last item that we identified that we  
21 felt was not adequately addressed in the DCD was  
22 supplemental requirements for non-safety related  
23 passive type SSCs important to safety. We found that  
24 most of the components that were listed in the design  
25 reliability assurance program were active-type

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1 components, and as you would expect those are the  
2 components that you would most be interested in when  
3 it comes to reliability. On the other hand we felt  
4 that passive components do and can play an important  
5 role in ensuring that these systems function. An  
6 example would be service water piping. Non-metallic  
7 piping had been proposed for that ground application,  
8 and we felt that it would be appropriate to include  
9 augmented requirements for risk-significant systems  
10 such as service water, which are identified as being  
11 risk-significant. And Westinghouse has clarified that  
12 they are using this for very limited applications in  
13 service water, and possibly component cooling water,  
14 and so we are trying to work out the details of what  
15 by doing our own site reviews.

16 Another example could be metallic piping  
17 in buried applications. We would want augmented  
18 requirements to make sure that that piping would not  
19 corrode excessively, with the appropriate coatings -  
20 cathodic protection and other measures - to ensure its  
21 integrity.

22 So this is another example where we are  
23 trying to look at the detailed design documents to  
24 ensure that proper supplemental requirements have been  
25 imposed in order to comply with the intent of GDC-1

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1 and GDC-2.

2 So are there any questions?

3 CHAIR RAY: Well, no, I just think as an  
4 observation all of the things you describe makes one  
5 wonder how the original certification stood in terms  
6 of addressing these issues. We've heard often that  
7 well, they were COL information items. They would  
8 have had to have been addressed by the COL applicant  
9 for example. Or there is DAC that has provided some  
10 measure of criteria of what was expected.

11 What you are describing here is, now we  
12 have taken this additional step, the applicant has,  
13 filled in a lot of this information, that's good, we  
14 review it and decide if it's okay. But supposing we  
15 hadn't? That's not a question for you. I'm just  
16 telling you, that's one of the things that we have to  
17 think about.

18 MR. McNALLY: My only explanation is that  
19 this is really related to the design acceptance  
20 criteria, and I think it was recognized that the  
21 detailed design was going to be progressing, and that  
22 some of these design details would be available later  
23 on in the design. And it's also with the  
24 understanding that staff doesn't do a detailed review  
25 of every individual component in the plant. We really

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1 tend to focus on the criteria, and then selectively  
2 see how that criteria is applied. We don't perform  
3 really a quality control check. We expect the  
4 applicant to do that. So hopefully during the  
5 detailed design, during future engineering design  
6 verification inspections, these types of discrepancies  
7 would be identified and corrected.

8 CHAIR RAY: I don't know whether we want  
9 to call them discrepancies or not. The real question  
10 is again is - are the design acceptance criteria  
11 sufficient, and now we are simply replacing them with  
12 the details? Or were they not sufficient in the first  
13 place? Again, that's a rhetorical question. Don't  
14 try to answer it. I'm not asking for an answer. But  
15 that is nevertheless an issue that we are trying to  
16 get some understanding. I mean it's fine if now you  
17 know the answer to the design acceptance criteria  
18 questions. Amend the certification and put it in.  
19 That has all the benefits of standardization and  
20 reduced uncertainty and so on and so forth.

21 The real question is, were the design  
22 acceptance criteria originally sufficient? Okay? All  
23 right, go ahead.

24 MR. McNALLY: We still seem to be working  
25 through exactly what requirements we should place on

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1 RTNSS components. That's an open question we keep  
2 coming back to, and yet I'm not sure we have a  
3 completely satisfactory answer except to sort of  
4 wrestle it out case by case.

5 CHAIR RAY: Well, it is an open item in  
6 this case, isn't it?

7 MR. McNALLY: Yes, exactly what  
8 requirements should be met.

9 MR. CUMMINS: Ed Cummins. We believe  
10 that the certified design established the requirements  
11 for RTNSS, and that the staff is taking a different  
12 view of that. So we are not in agreement with this  
13 reclassification of equipment to higher standards than  
14 were already recorded in the DCD.

15 MR. McNALLY: I believe our position is  
16 that it is up to Westinghouse to dictate what the  
17 augmented requirements should be in order to ensure  
18 the reliability and functionality of RTNSS-type  
19 equipment, and that should be identified in their PRA  
20 and the whole RTNSS process. So if Westinghouse can  
21 justify that the equipment need not be functional  
22 after a seismic event, that they don't credit it, and  
23 there is a good basis that is documented for that,  
24 then staff would concur with that approach.

25 CHAIR RAY: These are simply examples at

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1 least in my mind that are food for thought as we  
2 consider this process that we are all engaged in here  
3 and see what we can learn from it. Okay, questions?

4 MS. LI: I am Renee Li from engineering  
5 mechanics branch two. The topic I am going to discuss  
6 is completion of design pipe rack hazard analysis  
7 report, which is within the scope of SRP 3.6.1 and  
8 3.6.2.

9 The regulatory spaces for these topics --

10 CHAIR RAY: Good heavens. That's awfully  
11 wordy slides.

12 MS. LI: -- which requires the SSCs  
13 important safety design to accommodate the dynamic and  
14 environmental effects resulting from postulated pipe  
15 failures. Before my discussion I would like to make a  
16 note that there are two aspects involved in the pipe  
17 rack hazard analysis, the design aspect, and the as-  
18 built reconsideration of the construction.

19 The staff's review for the design aspect  
20 includes reviewing the applicant's methodology and the  
21 criteria for evaluating the effects of postulated pipe  
22 failure. The staff also needs to verify that the pipe  
23 rack analysis report, completed by the applicant, is  
24 done in accordance with the criteria and methodology  
25 described in DCD and in applicable regulation.

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1           And then the as-built reconsideration is  
2 to ensure that the plant is built in accordance with  
3 the design and meets applicable regulation. Based on  
4 this review, the staff found in NUREG-1793 that the  
5 applicant's criteria and methodology as described in  
6 DCD is acceptable. The staff also found the as-built  
7 reconsideration does include in PO1 ITAAC is  
8 acceptable.

9           As I said earlier, so today I am going to  
10 discuss the completion of the design, pipe rack hazard  
11 analysis report. Let's go to the slides. In AP1000  
12 DCD Rev 17 and two subsequent letters, dated June 30  
13 and July 22<sup>nd</sup>, 2009, Westinghouse proposed changes to  
14 DCD subsection 3.6.4.1, which is COL information item,  
15 and 6-1.

16           It is pertaining to the completion of the  
17 design pipe rack analysis report. The analysis was to  
18 be completed prior to the approval of the amendment,  
19 and the COL item was removed. In those subsequent  
20 letters I mentioned before, Westinghouse stated that  
21 it will complete the design hyper-analysis report,  
22 which the exception of some pipe whip restraint, and  
23 jet shield design by December 31<sup>st</sup>, 2009, and the  
24 completion of the remaining pipe hood restraint and  
25 jet shield design will require and modify a COL

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1 information item to be addressed in a COL Application.

2 And this is what our plan is, upon the  
3 completion of that report by Westinghouse, the staff  
4 will perform an audit which is expected in early 2010,  
5 to ensure the analysis is indeed performed in  
6 accordance with the criteria outlined in DCD Sections  
7 3.6.1.3.2, and 3.6.2.5. For all the piping system  
8 within the scope of SRP 3.6.1 and 3.6.2, and meets the  
9 regulations.

10 So pending a satisfactory audit of the  
11 design pipe rack hyper-analysis report, and modify the  
12 COL information item, or an ITAAC item that requires  
13 COL Applicant to complete the remaining pipe whip and  
14 jet shield design, the design pipe rack analysis is  
15 still considered as an open item.

16 And that concludes my presentation.

17 CHAIR RAY: Thank you, Renee. Any  
18 questions?

19 MEMBER ARMIJO: When that final pipe whip  
20 and jet shield design is completed, does it ever get  
21 into the DCD in any form?

22 MS. LI: The DCD describes the criteria  
23 and methodology for those design, and so as I said  
24 when I audit the pipe hyper-analysis report, I will  
25 verify the methodology in the report if indeed it is

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1 consistent with the criteria that are in the DCD.

2 MEMBER ARMIJO: It doesn't have to? I  
3 guess my question is more toward Westinghouse. Once  
4 you have completed all this work you have all that  
5 design detail, that information into a DCD in some  
6 form so it isn't sitting out there in space, in COL  
7 land or something.

8 MR. LINDGREN: This is Don Lindgren with  
9 Westinghouse. We have currently conceptual designs of  
10 a couple of restraint designs in the DCD. If we do  
11 not - if the current plan does not complete whip  
12 restraint designs as part of the review of the  
13 amendment, there is really no mechanism to get them  
14 into the DCD after that. It becomes a COL Applicant  
15 responsibility. This is really a level of detail that  
16 typically is not included in the DCD anyway.

17 MR. SISK: This is Rob Sisk,  
18 Westinghouse. As I think Renee correctly indicated,  
19 the criteria and the process for what needs to be done  
20 is in the DCD. What we're really talking about here  
21 is the actual review of the calculations and the work  
22 that will have to be reviewed by audit. That kind of  
23 information is not normally maintained at the DCD  
24 level, but the criteria and the process and  
25 requirements are what would be helpful. So I think

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1 the answer to your question is, we would not come back  
2 for this purpose to put these calcs or these work  
3 restraints into the DCD. The procedure, the criteria,  
4 didn't change; it just needs to be completed.

5 MS. LI: Yes, to supplement that, after I  
6 complete the audit, I would refer to the Westinghouse  
7 report, technical report or whatever they call it,  
8 which will be in SER supplement. And then that would  
9 be on the docket. So I think - but the detail would  
10 not be in the DCD.

11 MEMBER ARMIJO: Thank you.

12 CHAIR RAY: Okay, next.

13 MS. MCKENNA: Okay, we can bring up the  
14 next couple of staff, or we could break it, it's your  
15 decision.

16 CHAIR RAY: Well, I don't think it's time  
17 for us to take a break.

18 MS. MCKENNA: Okay, then we will see how  
19 far we get.

20 MR. WU: My name is Cheng Wu. Actually  
21 I'm known as John, John Wu, that is my name. So today  
22 I am going to talk about the Section 3.9.1, special  
23 topics for mechanical components. And in this section  
24 we covered two parts, changes, one is design  
25 transients. Three items related to design transients,

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1 and one related to fatigue analysis program called  
2 WESTEMS.

3           The design transients, we also looked at  
4 design transients. We have - I think Westinghouse  
5 covered this very well on these design transients.  
6 Then plant unit loading and unloading transients,  
7 which used to be 19,000, but now reduced to 2,000  
8 based on Westinghouse - actually loading and unloading  
9 is split into two parts. I think Westinghouse  
10 mentioned this earlier, two parts, one is loading, and  
11 unloading transients and the other one it is the load  
12 follow op. transients. And actually this transient  
13 normally assumes one occurrence per day, or reserve,  
14 these two combine, one occurrence per day. So one  
15 occurrence per day, so you operate for 60 years, so  
16 approximately - about 22,000. And 22,000 you estimate  
17 about 90 percent operation time, you got about 19,000  
18 estimate. So this is broken up into two - also there  
19 is a reason involved. Because once you have loading  
20 and unloading, they are not occurring simultaneously.  
21 So once you have loading and unloading, it splits  
22 into that 2,000 and 17,000.

23           MEMBER BLEY: When you think about that,  
24 one per day is a real over-estimate for a new plant in  
25 most applications. For a 40 or 50-year-old plant in

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1 other applications I don't know, have you thought  
2 about that? This is for the whole 60 years, right?

3 MEMBER ARMIJO: I guess these were -  
4 loading and unloading, is that equivalent to pump  
5 startup and shut down?

6 MR. WU: Pump startup and shutdown,  
7 that's a difference.

8 MEMBER ARMIJO: I wanted to get clear on  
9 that.

10 MR. WU: Pump startup and shutdown, I  
11 think that they originally did have different  
12 definitions. Now, to separate it to become startup  
13 and shutdown, okay, two conditions. So two conditions  
14 is startup, that it probably has half position, you  
15 know, startup, you know, the critical, something like  
16 that, like half position you start, one pump's already  
17 idle, something like that. And the shutdown it also  
18 have a similar case, like three already shut down once  
19 they're operating; these are similar, these two. So  
20 they actually and this is a new definition, it  
21 combined become one transient. So ordinarily it's at  
22 1,100 separate now it's 2,200. So those are the three  
23 transients we cover. I look at the history,  
24 background involved. They are acceptable. Leave no  
25 question, no open item on that.

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1           Number four, the fourth item is related to  
2 -- is something to do with FatiguePro, because  
3 FatiguePro is --

4           MEMBER SHACK:        But that's what I'm  
5 curious - this is now they're doing the whole piping  
6 design, so they have to do an ASME code fatigue  
7 analysis.

8           MR. WU:       Exactly right.

9           MEMBER SHACK:        Are they proposing to do  
10 that with WESTEMS?

11          MR. WU:        They have been using WESTEMS.  
12 That's why we know, I would think that now a lot of  
13 new plants, and a lot of operating plants, you can  
14 choose WESTEMS or like fatigue analysis. Consider  
15 those as the post-process of ANSYS. Sometimes ANSYS  
16 can do fatigue by itself, and sometimes not. And  
17 sometimes you say, this is only the post processor or  
18 pre-processor. So post-processing and pre-process  
19 sometime, you don't have to list for review. So that  
20 is sometimes --

21          MEMBER SHACK:        They don't want to live  
22 with a conservative code piping design rules. They  
23 want to do finite element analysis for the fatigue.

24          MR. WU:        They were two type of the  
25 criteria. One is based on the finite element

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1 analysis. Also, NB-32 analysis. And the joints,  
2 piping, 3600, NB-3600.

3 Now I think this is a fatigue, this is a  
4 WESTEMS that contains two, 3,200 rating is suitable,  
5 and it's good for a component, fatigue analysis,  
6 because of finite elements. And 36 is good for  
7 piping. And because we are aware there is - and I  
8 think Robert Hsu is an authority when he did the  
9 review, the audit, and he finds basing it in the  
10 calculation WESTEMS was mentioned in the calculation  
11 for fatigue analysis, and how come we don't have  
12 those, we never know. So now we - because that is a  
13 FatiguePro issue before, so we start have an RAI here.  
14 The thing with RAI there is that because of a lot of  
15 information is proprietary. So we cannot get it. So  
16 we go to the audit. In Westinghouse audit in  
17 Westinghouse, and because it is WESTEMS for the  
18 fatigue analyzers, this now is Version 4.5, so it's  
19 evolved quite awhile, maybe last 10 years, something  
20 like that. So there are a lot of documents.

21 So in that valid documents -- mostly are  
22 in their electronic system, I would say in their NRC  
23 EDMS system, something like that, EDMS, you know,  
24 everything is stored in there.

25 So therefore not old hard copy are

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1 available for reading. So now we review portions and  
2 we ask them for some portion -- which WESTEMS provided  
3 to do their analysis, or to do their -- documents, you  
4 know, the result in the documents. Then after the  
5 audits we continue the follow up audits in here, in  
6 Westinghouse Rockville office. So that is what come  
7 true because the first open item we say, complete --  
8 documents make available for our review. So because  
9 we have all the documents in Westinghouse Rockville  
10 office we continue with a follow up review. So that  
11 first open item is closed.

12 The second open item is related to really  
13 to our - actually related to their methodology. Their  
14 methodology is WESTEMS. WESTEMS is, first of all,  
15 they use one degree of increased interval, like you  
16 increase one degree, and which is used as the  
17 database. If they have a different temperature, they  
18 go through integration, then we find out the final  
19 results, and this one degree they use - sometimes they  
20 use a Westinghouse program, WESTEMS, sometimes they  
21 use ANSYS to do this. And we were saying, well,  
22 because of the material property, the material  
23 property is the function of temperature, like high  
24 temperature, you got 27.7 or something at high  
25 temperature, but the low temperature probably has 30

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1 10 to the sixth psi. So in each case, how you  
2 justify, you use the right one, how you do it, okay.  
3 That is the second question. So you may end up with a  
4 very different results if you use one degree.

5 So now this is a question that we've got  
6 to answer so they give us response, and also mention  
7 one of the Westinghouse guidelines. And Westinghouse  
8 guidelines, which we - the very late stages about the  
9 end of September we got that document. And we look at  
10 that document. And the guideline, it is also - I  
11 don't know if they are proprietary or not - but they  
12 have some kind of temperature. Overall if they select  
13 a raw E or raw Alpha as the material property, then  
14 the probable discrepancy may be only as much as 15  
15 percent. So 15 percent actually is not too bad. So  
16 therefore they have a suggestion - they use it. They  
17 either use the average one so you cut 15 percent in  
18 half, or you use like a very typical, very  
19 representative one to do it.

20 So and there are also - once they do it,  
21 they also compare it to do some kind of benchmark  
22 finite element measure to compare how good it is. And  
23 once it's good then they do the analysis, use those  
24 parameters to select it, to do the analysis.

25 And I think we can assure this way to do

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1 you know, to do that integration, to do the final  
2 stage result, over wide range of temperature, will be  
3 - it is appropriate and maybe conservative, they make  
4 sure it's conservative.

5 So but we will - we accept these  
6 guidelines. Only thing the guidelines are old, but  
7 old as users. The guidelines is a separate document,  
8 it's not in the users manual. So that the user has to  
9 avail these guidelines, how to avail these guidelines.

10 That is Westinghouse probably in the future.

11 But the methodology of the guideline, we  
12 accept that we're their guaranteed to get a good  
13 result. Therefore we say this issue will be closed.

14 MEMBER ARMIJO: But the WESTEMS code has  
15 not been submitted for review and approval to the  
16 staff. You are doing it - they are telling you  
17 they're using it; it's proprietary. You go to their  
18 site and you audit it and you say, well, we think the  
19 approach is okay, but we've got some technical issues,  
20 you are still working on that.

21 But the problem I have is, what if it  
22 changes? And the methodology changes, or input, or  
23 data or something.

24 MR. WU: That's right, that is the last  
25 one. They want to accept we close it as the number

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1 two open item.

2 MEMBER ARMIJO: How does the staff  
3 independently check fatigue analysis done by WESTEMS?  
4 Do you have your own code that you use to just do a  
5 sanity check at least on the results?

6 MR. WU: We don't - we have the code, but  
7 we don't check it. Right now we don't check it. We  
8 haven't checked it. It is an ongoing review of the  
9 Westinghouse, still ongoing review.

10 MEMBER SHACK: They are checking against  
11 benchmarks.

12 CHAIR RAY: Westinghouse is checking?

13 MR. WU: Westinghouse is checking, it's  
14 always reviewed, they are checking with benchmark  
15 problems such as like ANSYS they have temperature  
16 distribution from beginning to the end. So if they  
17 check that, WESTEMS, they can verify - validate with  
18 those results. We think that they probably --

19 MEMBER SHACK: I am still a little  
20 surprised they want to take the conservatism of sort  
21 of using this code and then picking a conservative  
22 benchmark. When you are using this as a fatigue-  
23 monitoring program it's one thing, because every  
24 transient is different, and you don't want to have to  
25 do a calculation for every transient. They have a

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1 couple of stylized transients here. I mean I'd just  
2 do the analysis for those transients, and I multiply  
3 by the numbers, and I'm done. Here they are going to  
4 go through this thing, and take a conservative  
5 penalty. It's their call, but it does seem a little  
6 strange.

7 MR. WU: Right, but it's our review, so  
8 we take it conservative, at least - we accept that.

9 MEMBER SHACK: Now this takes care of the  
10 kind of classic fatigue stuff. Sanjoy of course has  
11 left. We won't even get into his vortex syndrome.  
12 But how about all the criteria that they are using for  
13 things like - when they are really looking at things  
14 like from the striper. Are those reviewed by the  
15 staff and accepted as reasonable criteria for  
16 determining likelihood for striping?

17 MR. WU: The striping which is not - it's  
18 not included in their - not done by the WESTEMS.

19 MEMBER SHACK: But do you agree with  
20 their criteria? Or is that reviewed in some way?

21 MR. WU: Yes, the criteria, we look at  
22 the criteria as actually a part of the methodology,  
23 the criterion, 3200, you satisfy the codes.

24 MEMBER SHACK: No, no, I meant these  
25 criteria for when you have to consider thermal cycling

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1 or thermal striping, for example, or stratification.  
2 You know sections of piping system that have a slope  
3 greater than 45 degrees from the horizontal plane are  
4 not subject to thermal stratification cycling and  
5 striping thermal loads. Is that --

6 MR. WU: I think I would let the piping -

7 MR. HSU: Okay, basically, WESTEMS, this  
8 is Robert Hsu, okay.

9 REPORTER: Could you back away from the  
10 mike?

11 MR. HSU: Basically, the WESTEMS is a  
12 computer code, which is just take advantage of the  
13 computer, use the transfer function method, okay, to  
14 determine the stress. As far as you talking about the  
15 thermal cycling and striping, and stratifications, all  
16 those cases, that is your input, based on your input.  
17 You got to input a cycle number, and then you input  
18 it, temperature and pressure. They automatically  
19 calculate the stress for you. And then you have all  
20 those different transients combined. Maybe you have  
21 40 or 50 transients, and each transient with a defined  
22 number of cycles and the temperature and the pressure  
23 and the computer code automatically calculate the  
24 stress, automatically select the max, peak and the  
25 body and calculate for you. So all this, whatever

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1 cases we are talking about thermal stratification, all  
2 those cases, is just based on your input.

3 MEMBER SHACK: But at the moment they are  
4 coming in with an analysis that counts up those cycles  
5 we have been talking about before, and they are not  
6 really bringing in I don't think a thermal striping  
7 analysis of any particular component. Yet somehow  
8 they are assuming they are designing those away.

9 MR. HSU: Right now whatever they did is  
10 for example, the cycle for thermal stratification at  
11 this stage based on their best estimates they assume,  
12 and if they have the COL item, which is the surge line  
13 thermal stratification monitoring program, with this  
14 thermal stratification monitoring program they are  
15 going to verify whatever their input, whatever they  
16 assume, their best estimate, of the thermal cycle will  
17 still be valid. This monitoring program is including  
18 the hot functional and the force fuel cycle, and after  
19 this they were re-verify, or you could say they were  
20 evaluated. All the data they collect, and then  
21 compile that data and determine is there analysis  
22 where the envelope by the --

23 CONSULTANT KRESS: But I don't think the  
24 plants are like that, are they? That program is not  
25 looking for thermal stratification I don't think.

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1 MR. HSU: The code is just performing  
2 analysis.

3 CONSULTANT KRESS: I understand that.  
4 But the assurance that you don't have thermal striping  
5 in various components it's not looked for in this  
6 initial test program.

7 MR. WU: This is Westinghouse. They use  
8 the MV 3200 and MV 3600. Thermal striping and thermal  
9 stratification which is non-uniform coverage, and that  
10 is actually not in the regular piping codes, it  
11 doesn't cover that. Westinghouse is developing the  
12 code to cover this certification, but they have now -  
13 it's still under review right now.

14 So in other word the code, the ASME code,  
15 we assume circumferentially uniform piping, the  
16 temperature is uniform. So that's what Westinghouse  
17 is using now, equation 10, 11, and 14 to cover that.  
18 So this is - I don't think WESTEMS is proper to be  
19 used for those cases.

20 MEMBER SHACK: That's an interesting  
21 comment. There is at least one location where you  
22 think stratification might be a problem, there is a  
23 COL action item to go out and monitor that.

24 MR. HSU: The problem is because of -  
25 they cannot determine the stratification profile, and

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1 stratification cycle. They can use their best  
2 estimate at this stage, but they have to verify it  
3 later.

4 MEMBER SHACK: Are there any other cases  
5 like that?

6 MR. HSU: Any other cases - you talking  
7 about thermal stratification or what?

8 MEMBER ARMIJO: Yes, any kind of thermal  
9 fatigue, any kind of thermal fatigue, that says, okay,  
10 these are the suspect areas. We think we have  
11 designed the problem away but we are not sure, so we  
12 are going to monitor that.

13 MR. KOTWICKI: Phil Kotwicki from  
14 Westinghouse. We got into this a little bit a little  
15 earlier. There was an initial screening criteria that  
16 identified locations where you could have the  
17 potential for several of these issues.

18 MEMBER SHACK: But assuming that changed  
19 the design.

20 MR. KOTWICKI: But you could analyze for  
21 them with something like CFD, to see whether or not  
22 what you thought was true or not, and sometimes it is  
23 and sometimes it isn't. And if it is, you can either  
24 design for it, or you can try to change your layout or  
25 try to accommodate it.

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1           Certainly WESTEMS doesn't tell you whether  
2           or not you have it.  It's something else that tells  
3           you whether you have it, and then you can idealize it  
4           so that WESTEMS can evaluate it.  So that is what they  
5           are looking at here.

6           MEMBER SHACK:       But I mean that is not  
7           part of the ASME code analysis?

8           MR. KOTWICKI:       It's required as part of  
9           the ASME fatigue evaluation.  So if you have a  
10          transient that acts on a component, and you have a  
11          component that is in a regime where you've got some  
12          kind of thermal cross-section that isn't uniform, then  
13          you need to account for it somehow.  So the  
14          stratification, the piping, the turbulent penetration,  
15          all of these things can be idealized with code like  
16          CFD and/or ANSYS, and if you've got a very detailed  
17          component that you need to look at, you can do a  
18          detailed finite element analysis and get temperature  
19          distributions that can then be fed into a code like  
20          WESTEMS that is going to give you what the ASME code  
21          is asking you to evaluate as far as ultimately  
22          stresses and allowable cycles.

23          MEMBER SHACK:       Okay, but then these  
24          criteria sort of set up where you start to go look for  
25          these sorts of things?

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1 MR. KOTWICKI: These criteria being?

2 MEMBER SHACK: The things on page 3950,  
3 which identify where I might get stratification.

4 MR. KOTWICKI: Like we had mentioned in  
5 the MRP or EPRI defining locations where these kinds  
6 of things have been identified before. So if you've  
7 got layouts, or you've got changes in elevation where  
8 stratification could potentially occur, or you've got  
9 turbulent penetration, or you've got all of the things  
10 that they list, there are at least to the best of  
11 their knowledge available ways to go through and  
12 screen for those. And you take the next step after  
13 the screening to see whether or not it pans out as a  
14 problem or not. Not necessarily a problem, something  
15 that you need to take another step. Either it will go  
16 away - well, I thought it was but it really isn't. Or  
17 I thought it was, and yes it is indeed, and I need to  
18 evaluate it.

19 What they tried to do obviously - not  
20 obviously - but what they tried to do is address it as  
21 conservatively as they can originally, and if that  
22 gets them through all the better.

23 MEMBER SHACK: You could say there that  
24 the screening criteria might have missed some, and  
25 once you get the plant built - you won't be able to

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1 find those because it's all insulated and not  
2 instrumented for?

3 MR. KOTWICKI: You always have surprises.  
4 There will be cracks. It sounds like a good process  
5 to me.

6 CHAIR RAY: Okay, let's pick up and see  
7 if we can move forward.

8 MR. WU: Okay, so that is polar  
9 obstructing the non-uniform casing. That concluded  
10 first open item. Second open item we accept. The  
11 third open item is related to WESTEMS. In the WESTEMS  
12 they have the option to use - they use the summation  
13 of moments in three algebraic sums of the moment in  
14 three directions to determine the peak and valley type  
15 points and then to do the - from there evaluate the  
16 strengths before they can analyze this. This - we  
17 have - we still have the problem dealing with the  
18 issues of algebraic sum of moment in three directions  
19 which particularly doesn't mean anything and also can  
20 be something else. But this Westinghouse now still  
21 has the responses to -- they use that to determine the  
22 peak and valley type points only and not to evaluate  
23 the moment based on the ASME codes. The moment you  
24 have has to be obtained using that three equations.  
25 So this is - we are still not - Westinghouse in their

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1 response they give what they use for this, this kind  
2 of result of the moment, they give the reason they use  
3 that. But it's a critical reason, it's in the  
4 technical basis. It's not clear. So this is - also  
5 we can still not accept this adequate sample.

6 So this is still remaining, we still need  
7 to have a discussion with Westinghouse on this. So  
8 this is number three of the open items, still open.  
9 And we have to follow up with Westinghouse.

10 Number four is because of doing the audits  
11 we find sometimes benchmark problem has a different  
12 input as the WESTEMS run, WESTEMS computer run. So  
13 given this - because of that, the comparison were  
14 meaningless. Because you got - so with what in  
15 Westinghouse the response was, they were - we do this,  
16 and use the same input consistently. And the result,  
17 the benchmark problem results will be available in  
18 December of this year. So we wait until December of  
19 this year for this. We will see what we will get.

20 Number five, open item. We asked  
21 Westinghouse, they showed they have an interactive  
22 option, they can do that from the PC interactively and  
23 run the WESTEMS. And this interactive WESTEMS, and  
24 you also can revise, like revise, if you have a lot of  
25 different transients, some transients that is not

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1 proper for WESTEMS, they can revise it manually. So  
2 they can revise the input manually, then after that  
3 then they will - after that they revised the input put  
4 in the WESTEMS, and get it out. Put it in the  
5 WESTEMS, and they are documented.

6 Then after that document, so they know  
7 this is revised so many times you input, you can input  
8 material property or the loading, the loading  
9 configuration. So we think that this is manually  
10 multiply the inputs without some certain configuration  
11 control. First of all you can conglomerate controls.

12 You got to document the records to see why you needed  
13 to revise the input, what the reason and et cetera.

14 So they don't have those amalgamation of  
15 controls. So we still need to discuss this with  
16 Westinghouse. So this still remains open and needs to  
17 be discussed. So we already sent number three and  
18 number four followup RAIs to Westinghouse for their  
19 response, and number four will wait until December to  
20 see what we can. That conclude my --

21 CHAIR RAY: Any questions for John?

22 All right, hearing none we will resume at  
23 1:00 o'clock.

24 (Whereupon, the above-entitled matter went  
25 off the record at 12:04 p.m. and resumed at 1:00 p.m.)

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1 CHAIR RAY: Okay, let me get us on the  
2 record here.

3 The next topic we have is 3.9.2. If our  
4 resumer doesn't show up we will skip over to 3.9.3.

5 MS. McKENNA: Same presenter. I'm sorry.

6 CHAIR RAY: Let me just say that at this  
7 point in time, for those who have commitments at the  
8 end of the day, we are running behind, as everybody  
9 knows. I can't estimate exactly how much at this  
10 point, but an hour or so. I hope we will catch up  
11 some this afternoon. But we do have one added item  
12 that I mentioned earlier that we will be dealing with  
13 as part of the NRC final presentation, item seven on  
14 the agenda.

15 So my expectation is that we will run  
16 beyond the advertised time, but we will try and keep  
17 it as little as possible. Gathering together like  
18 this is hard enough; we don't want to do anything to  
19 not get everything out of that we should while we are  
20 here. So we will run over some if that is necessary.

21 That having been said, where are we,  
22 Eileen? Are we ready? Ready to go, so let's resume,  
23 I should say.

24 MS. SPICHER: Hi, my name is Terry  
25 Spicher, and I work at engineering mechanics branch

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1 one. In SRP Section 3.9.2 is dynamic testing and  
2 analysis of system structures and components. And in  
3 this SRP section we address the criteria, testing  
4 procedures, and dynamic analysis employed to ensure  
5 the structural and functional integrity of reactor  
6 internals under vibratory loads.

7 This Rev 15 of AP1000 the staff approved  
8 this section, and it was certified. In Rev 17 they  
9 had a few changes that were discussed earlier today.  
10 And one area I was going to talk about, and that was  
11 the flowskirt.

12 We did have an open item, it was OI-SRP-  
13 3.9.2-EMP 1-07, and that open item was related to the  
14 flowskirt. The flowskirt we know creates a more  
15 uniform - in the flow distribution to the fuel bundle.

16 After we reviewed the information in Rev 17 we were a  
17 little concerned and requested the applicant to  
18 discuss a potential for the generation of vertices in  
19 the region of flowskirt, and if it had any type of  
20 potential adverse effect on the response of other  
21 internals.

22 Westinghouse did provide us with analysis  
23 information that explained the diminished likelihood  
24 of large vertex formation in the lower plenum was  
25 unlikely. They also discussed with us the lower

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1 vibration - I mean, excuse me, lower velocity  
2 gradients from the greater flow uniformity, and it  
3 diminished the large vortex formation. As well the  
4 flowskirts are used in System 80 plants, and we are  
5 able to review reports from these System 80 plants,  
6 which also show that the vibration was lower. So open  
7 item OI-SRP-3.9.2 EMB 1-07 has been resolved.

8 CHAIR RAY: Very good.

9 MS. MCKENNA: Okay, now we are going to  
10 proceed. Is Tuan Le here?

11 CHAIR RAY: Right.

12 MR. LE: Hello. My name is Tuan Le. I  
13 did technical review for 3.9.3.540. The SME has one,  
14 two, three components, and components four support  
15 structure. In the review the DCD amendments, the COL  
16 items, one COL item, this item is allowed staff audit  
17 design specification and report was deleted, as a  
18 result of this, because we established the audit for  
19 the design specification reports, those were provided  
20 by the Westinghouse. And staff considered this change  
21 acceptable with the exception of the piping review  
22 which is addressed in Section 3.12. During the 2008  
23 staff conducted an audit for AP1000 for specification  
24 and reports. Staff identified two open items, one is  
25 the reactor vessel J-groove weld did not meet the ASME

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1 report.

2 MEMBER SHACK: In what respect?

3 MR. LE: In respect of the - staff  
4 reviewed the design report indicating the stress on  
5 the welds were exceeded with respect to the code and  
6 the plastic analysis did - was performed in this area,  
7 demonstrates the desire to meet the requirements of  
8 the code.

9 The second item --

10 CHAIR RAY: Did that answer your  
11 question, Bill?

12 MEMBER SHACK: Yes.

13 MR. LE: The second item is regarding the  
14 containment surface and screen designs. We asked  
15 Westinghouse to provide details in drawings, design  
16 loads, load combinations basic for pressure loading on  
17 the screens so the staff can do additional review of  
18 that.

19 So there are two items. As now, the first  
20 item, I believe, is response from the Westinghouse  
21 indicating they had completed the plastic analysis and  
22 start enforcers scheduling to do additional review on  
23 that as the confirmation items. The standard review,  
24 their plastic analysis, and also the previous  
25 assumption that they had in the integrating package

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1 that the do particular analysis for J-groove weld,  
2 make a determination, the second determination for the  
3 weld joints. So that's own the road.

4 The second item, they had a containment on  
5 the surface screen, that is still waiting for the  
6 small details, just now we provide to the staff for  
7 review such as drawing has not provided to the staff,  
8 to take a look at it.

9 That is our only two items that is for  
10 3.9.3 open. Is there any question, discussion?

11 CHAIR RAY: Well, in the case of the  
12 screens, what existed as a requirement in the existing  
13 certified design?

14 MR. LE: The existing requirement for the  
15 design is considered as the latest Westinghouse  
16 product for the screen was the safety-related  
17 component. The design criteria conformed to the GSI-  
18 191 which relates to the Chapter 3.6. With 3.9.3, we  
19 look at the loading combination on the screen and the  
20 related debris that are blocking the screen, how is  
21 the integrity of the component stands in the load of  
22 the debris, of the mass of debris. And also the  
23 difference of pressure above the screen.

24 CHAIR RAY: What is the certified  
25 requirement? Can you say that in a simple way? What

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1 is the certified design requirement with regard to  
2 this issue?

3 MR. CUMMINS: This is Ed Cummins. There  
4 is a COL item in DCD, Rev 15, related to screens,  
5 because the GSI-191 was still going back then, and  
6 there wasn't really an approved methodology to analyze  
7 what was needed, and so we agreed with the staff that  
8 we would have a COL item on the design of the screens.  
9 Now that might not answer his question directly, but  
10 certainly there was an opening for additional review.

11 CHAIR RAY: That's fine, Ed, and I think  
12 answers the question. This is intended when this open  
13 item is closed to replace that COL information item.  
14 Okay. That's the simple answer I want.

15 MS. McKENNA: But the COL item is  
16 actually broader than just the structural analysis of  
17 the screen.

18 CHAIR RAY: I'm sure it is, Eileen, but  
19 I'm just looking at this narrow question.

20 MS. McKENNA: I understand.

21 CHAIR RAY: This issue is being  
22 questioned today because the COL information item is  
23 intended to be replaced by this and other things that  
24 will address the issue. Thank you.

25 MS. LI: Any other questions?

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1 MEMBER BANERJEE: What is the buffer?

2 MR. CUMMINS: Ed Cummins. The buffer is  
3 trisodium phosphate.

4 CHAIR RAY: Okay, 3.10.

5 MR. CHEN: Section 3.10, seismic  
6 dynamics. My name is Pei-ying Chen from engineering  
7 mechanics two.

8 The change - significant changes from  
9 Revision 15 to 17 are basically two areas. One,  
10 Westinghouse decided not to use the experience-based  
11 approach for seismic qualifications, and therefore,  
12 those area of DCD has been removed.

13 The second area is that basically it's a  
14 spectrum exceedance in the high frequency area.  
15 Recent seismic header analysis indicates that for  
16 certain Eastern sites, they are basically rock site,  
17 hard rock site, and therefore there will be a high  
18 frequency effect on the equipment performance.

19 So the second area actually was addressed  
20 initially in a Westinghouse Topical Report 115, and I  
21 reviewed that, and we had about 10 RAIs for that  
22 particular topical. However, in Revision 17, they  
23 took basically the TR-115 information, and  
24 incorporated that into one of the appendixes in  
25 Revision 17 of DCD, which is basically Appendix 3I.

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1           The exceedance is basically the ground  
2 motion response spectra exceeded the 35 design  
3 response spectra, or CSDRS. And we reviewed that  
4 particular issue according to SRP 3.10, and then we  
5 have a staff guidance ISG-1, and then we also review  
6 that document, safety paper 93 0A7 related to seismic  
7 qualification of equipment.

8           The resolution of those 10 RAIs have been  
9 completed, and the SER written - SER for the Revision  
10 17. One of the significant issues I thought I would  
11 bring up here is that for high frequency exceedance  
12 area where Westinghouse basically performed a so-  
13 called screening test for SSE, Safe Shutdown  
14 Earthquake, and when we are reviewing it, we thought  
15 well in order to satisfy the regulations, equipment  
16 complication normally is performed for 5 OBE and  
17 followed by one SSE. Well, in the high frequency area  
18 Westinghouse only testing SSE. So RAI says, how come  
19 you are not considering 5 OBE for high frequency.

20           Then after a couple of iterations,  
21 Westinghouse said that their CSDRS testing, the  
22 standard design testing, can be considered as 5 OBE  
23 for high frequency fatigue effect. And then I  
24 thought, okay, if that is the case, I need  
25 Westinghouse to perform some calculations saying that

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1 the CSDRS 5 OBE 1 SSE to the 35 design spectra is  
2 equivalent or greater than 5 OBE for the high  
3 frequency. If they did, and look at it, and looks  
4 acceptable, and therefore that issue has been  
5 resolved, and there is no open issue for this  
6 particular section 3.10.

7 CHAIR RAY: Well done. Any questions?  
8 Thank you.

9 MR. HSU: Okay, this is Robert Hsu. We  
10 are going to discuss Section 3.12. I'm in  
11 engineering, mechanics branch. And basically what we  
12 did is, the major change for this DCD Revision 17 is  
13 the Westinghouse proposed removal of the piping deck  
14 to the conclusion of the risk-significant piping  
15 design report. So this COI for the design spec and  
16 the report will be moot. So Westinghouse took all  
17 responsibility for the complete design and complete  
18 design spec. So during the COL time period, the COL  
19 will now be bothered with this, COL only have to  
20 address the as-built reconciliation and ITAAC. So  
21 staff performed piping design completion review,  
22 activity review, during the audit, August 30 to the  
23 September 18. And the staff identified a lot of the  
24 issues related with the packaging, which is not  
25 completed. Because they finished their analysis, but

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1 they leave a lot of space or some kind of fluid  
2 dynamics condition, they haven't analyzed, and they  
3 leave a lot of open item in there, and so basically  
4 which is not meet the regulations, and this for 10 CFR  
5 50.55(a).

6 So we need additional work to close this  
7 DAC. And a lot of major issue is that - high  
8 frequency, seismic input. I think that a lot of  
9 people already discussed. And in the TR 115, the  
10 piping stress and their result which demonstrate a  
11 comparison. They used a Standard AP1000 CSDIS and  
12 compare with the high frequency GMRS, Ground Motion  
13 Response Spectra, seismic input, which is identified  
14 in some specific response spectra for the hard rock  
15 high frequency ground motion response spectra. And  
16 then the result which demonstrated the CSPRS which is  
17 - can be used, as I represented, as a HRHF seismic  
18 input.

19 And HRHF Ground Motion Response Spectra  
20 exceed the spectra, identify the current in the DCD.

21 They have to demonstrate, following the methodology  
22 and the strength criteria they provided in the DCD.  
23 Those are the two major changes.

24 CHAIR RAY: Okay, understood. Any  
25 questions?

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1 MEMBER BLEY: They may not have aligned  
2 things properly. I thought on 3.12 Westinghouse told  
3 us they thought they had submitted what they needed to  
4 close the open items. Did I misinterpret what I  
5 heard?

6 MR. LINDGREN: No.

7 MEMBER BLEY: No? Okay.

8 MR. LINDGREN: No, not on 3.12.

9 MEMBER BLEY: Okay, I'm fine.

10 CHAIR RAY: Anything else?

11 Thank you.

12 Okay, so we are precisely 40 minutes  
13 behind schedule, not as bad as I thought. And we are  
14 ready for the afternoon discussion, which means, Rob,  
15 you are up.

16 MEMBER ARMIJO: Mr. Chairman?

17 CHAIR RAY: Yes.

18 MEMBER ARMIJO: I'm sorry I was tied up  
19 in another meeting, and if I missed it. A question I  
20 wanted to ask - oh, that's me.

21 Maybe Bill already asked this, it's on  
22 3.9.3 presentation, and that statement is made by the  
23 staff, reactor vessel J-groove weld does not meet the  
24 ASME code. This is a pretty standard weld. I wanted  
25 to know is this that the analysis hasn't demonstrated

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1 that it meets the code, or is the staff saying that  
2 the design --

3 CHAIR RAY: Bill did ask the question.

4 MEMBER ARMIJO: So just give me the  
5 answer and I'll be quick.

6 MR. SUBUDHI: I can. Mano Subudhi from  
7 Brookhaven National Lab. I audited the design report.

8 What they did is they used by analysis, when they  
9 took two transients to calculate equation 10, primary  
10 plus secondary stress, they didn't meet the 3SM  
11 requirement. Then they took out the thermal  
12 separately because code allows it, still they couldn't  
13 meet the 3SM requirement. So the question comes, does  
14 the plastic shakedown occurs or not. And that is a  
15 question I asked, have you done a plastic analysis,  
16 since it has gone for the plastic range, it is  
17 normally in elastic range. And they didn't do it.  
18 What they did is, these stresses are calculated as  
19 stress intensity range. They have the big stresses,  
20 maximum shear stresses, so they are not calculating -  
21 they broke the stress into sigma x, sigma y, sigma z,  
22 and each component they are satisfied. I said code  
23 doesn't allow that. Code is always stress range and  
24 it is the stress intensive. If you are going to use  
25 the code you cannot use both ways. And they keep on

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1 fighting, no, we can use it. I did not accept it. I  
2 caused them code if you don't satisfy then go to the  
3 plastic analysis, make sure it's set down does occur.

4 If set down doesn't occur then you have to go back  
5 and redesign the whole thing.

6 And they said that that's what they did,  
7 and I have not reviewed it.

8 CHAIR RAY: That's where it stands right  
9 now? Okay, thank you.

10 All right, proceed.

11 DCDA CHAPTER 3 Sections 3.3, 3.5.3

12 MR. LINDGREN: Okay, a couple of  
13 housekeeping things first. Previously Phil Kotwicki  
14 used the example of the pipe - the pump heat exchanger  
15 pipe as an example where we had made a change to the  
16 DCD. He is in fact too current. It's not that had  
17 been added, strictly speaking. And we are going to  
18 let our piping and component people now. We think we  
19 are done talking about piping as a component. If  
20 anyone else has a disagreement with that let us know.

21 CHAIR RAY: Just for today.

22 MR. LINDGREN: Just for today, yes.

23 3.3 is the wind and tornado. We are  
24 talking - this section talks about wind, tornado  
25 loadings and missiles. It's 3.3 and 3.5. 3.3 the

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1 changes we included we reduced the height of the  
2 shield building because the enhanced shield building  
3 has a slightly reduced height which of course reduces  
4 the wind loadings and the tornado loadings.

5 We revised the COL information item  
6 providing additional information - provided additional  
7 information support to the design certification.

8 We updated - the COL requires that you  
9 address the interface criteria for programs. We made  
10 it more specific about what exactly needs to be done,  
11 what information needs to be provided to do that,  
12 rather than just saying wind and tornado in your area.

13 The site parameters for the wind speed and  
14 the tornado speed were not changed.

15 MEMBER BANERJEE: Remind us what were  
16 these site parameters particularly?

17 MR. LINDGREN: It's 145 mile per hour  
18 wind, and there's three-second gusts with an  
19 importance factor of 1.5 for safety ratings. And a  
20 tornado is 300 miles per hour.

21 MEMBER BANERJEE: The average wind speed  
22 was 145, or the gusts?

23 MR. LINDGREN: The gusts.

24 MEMBER BANERJEE: The gusts were 145.  
25 And what was the average wind speed?

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1 MR. LINDGREN: We design for that level.

2 MEMBER BANERJEE: That's controlling -

3 MR. CHUANG: According to AIC Rev 7  
4 following the so-called exposure, 33 feet above the  
5 ground in open air.

6 MEMBER BANERJEE: So the three-second  
7 gust is - provides sufficient load as a determining  
8 load.

9 So how often do these three-second gusts  
10 come? I mean this is a turbulent flow, right? And so  
11 therefore you have a frequency of oscillation. And if  
12 you have a three-second gust, it has to recur. What  
13 is the recurrence frequency in the turbulence?

14 MR. CHUANG: I think ten to the minus  
15 four.

16 MR. LINDGREN: This is designed on a  
17 steady state basis.

18 MEMBER BANERJEE: Oh, there is no  
19 buffeting, okay. So buffeting does not become the  
20 determining factor here? It's just a steady load.  
21 And that actually is the limiting load, rather than  
22 buffeting? That is the design basis?

23 MR. CHUANG: I think so.

24 MEMBER BANERJEE: So it's determined by  
25 the tornado basically.

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1 MR. LINDGREN: We have a couple of open  
2 items that are really more missile open items There  
3 was a question about the turbine building is a  
4 building that uses steel siding and they asked us to  
5 evaluate the impact of the steel siding from the  
6 turbine building on the modular wall on the strength  
7 of the enhanced shield building. I can now change  
8 that status to response is in review. So it will be  
9 to the staff in another week or so.

10 It's not a challenge to the building at  
11 all.

12 And the second ones ask about the impact  
13 of the three radwaste tanks we added as missiles on  
14 the collapse of the radwaste building and their effect  
15 on the aux building. That response is being prepared,  
16 so in another two or three weeks we will be turning  
17 that one in. It's also once again not a challenge to  
18 the aux building.

19 3.5 is missile protection. The changes we  
20 made were, we made specific requirements for the wind  
21 interface requirements. Once again there was a COL  
22 information item that said, address the site interface  
23 requirements, which is a fairly vague requirement. So  
24 we changed the - did some analysis and changed the COL  
25 information item to provide information that is more

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1 specific.

2 So as far as the tornado missiles are  
3 concerned the applicant has to verify the building  
4 construction and location is basically the same as we  
5 assumed in our analysis, that there are not other  
6 buildings close enough to the site to represent a new  
7 missile - tornado missile threat.

8 Also they have to show that other site  
9 missile sources are bounded by tornadoes. As I said,  
10 we made that COL information item more specific.

11 There are some conforming changes, or  
12 changes in other sections, including the changes to  
13 the shield building. The missile spectrum is not  
14 changed. And we have the same open items that are  
15 listed in 3.3 as 3.5 open items.

16 There are a couple of issues that are  
17 really COL issues, but we have addressed them  
18 generically. The NRC guidance on evaluation of  
19 tornado-driven missiles says you need to look at  
20 automobiles above ground level, because ground level  
21 is where it's parked. And we have a couple of sites  
22 where the parking lot is elevated above the grade,  
23 right around the plant. So we have looked at  
24 elevations above 130 feet, and basically at all  
25 elevations the aux building including the roof and

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1 shield building up to the roof, which should cover all  
2 of the sites we have, and the building of course would  
3 withstand the attack.

4 MEMBER ARMIJO: What size of automobile  
5 do you pick?

6 MR. LINDGREN: I believe the reg guide  
7 says a 3,000 pound automobile. Not a Hummer.

8 MR. SISK: Four thousand pounds.

9 MR. LINDGREN: It's the reg guide  
10 automobile.

11 Okay, and it's within - it's automobiles  
12 within half a mile. Okay, so the next one. The other  
13 items that comes under missile protection is the  
14 impact of a neighboring unit turbine missile. The  
15 AP1000 design certification just for a certified unit  
16 what all of our applicants have dual unit -  
17 expectations to put in dual units, and they are either  
18 side by side or close to side by side. So we have  
19 once again addressed this on a generic basis basically  
20 relying on guidance in the regulatory guide. We have  
21 determined that the probability of destructive  
22 overspeeds and missile generation from the turbines is  
23 less than  $10^{-5}$  per year. That criteria, that  
24 probability, satisfies the criteria in the Reg Guide  
25 for an unfavorably oriented turbine - an unfavorably

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1 oriented turbine is basically the configuration with  
2 the turbine oriented close to the reactor vessel with  
3 - in such a way that missiles coming out perpendicular  
4 form the turbine would strike the containment or  
5 safety related equipment.

6 AP1000 units located side by side are in  
7 an orientation no worse than an unfavorable  
8 orientation, and they are separated by 800 feet, at  
9 least 800 feet, so we believe that satisfies the  
10 concern.

11 And that's where we are.

12 CHAIR RAY: Related to this I'll note we  
13 discussed yesterday was the reduction in intercept  
14 valve testing frequency, which I assume is factored  
15 into this one time  $10^{-5}$  per year?

16 MR. LINDGREN: Yes.

17 CHAIR RAY: I'd still like to see us look  
18 at that as we discussed yesterday.

19 Staff's turn now.

20 NRC CHAPTER 3 DSER/Ols - Sections 3.3, 3.5.3

21 MR. CHUANG: My name is Jerry Chuang, from  
22 structural engineering. I will present a review of  
23 SRP 3.3 as well as 3.5, varian designs against missile  
24 attack.

25 The area, 3.3 we don't have any organizing

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1 for 3.3.1. We do have two open items, as already  
2 discussed by Westinghouse, in 3.3.2. This is  
3 according to ASCE 7 standard, Section 6.

4 In the case of 3.3.2 transitional and  
5 rotational, it handles the wind speed. This is  
6 including translational and rotational speed I'll note  
7 pressure drop, and the spectrum of missiles. This is  
8 according to again ASCE 7, Section 6, as well as Reg  
9 Guide 1.76 on Design Basis Tornado, and the tornado  
10 research for nuclear power plants.

11 Essentially wind readings are defined by  
12 AP1000 as the basic wind speed, 145 miles per hour.  
13 This is also described by Westinghouse. And in case  
14 of tornado loading it says, wind speeds, 300 miles,  
15 but we include 240 mph, translation for us, 60 miles  
16 per hour for the location. And in the design --  
17 pressure drop is two psi, and rate of pressure change  
18 is 1.2 psi per second. The radius of the dome from  
19 maximum rotational wind from the center is 150 feet.

20 CHAIR RAY: Excuse me.

21 (Off the record comment.)

22 MR. CHUANG: Then by Westinghouse with  
23 regard to the COPD. They reduced the rise from 25-1/2  
24 feet down to 20-1/2 feet with respect to the wind  
25 load. The staff calculated the reduction is about 100

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1 percent. Therefore it is acceptable. This reduction  
2 also have some side effect, in other words, additional  
3 benefit, could reduce the risk of being hit by a  
4 falling object. Such as aircraft.

5 Second change is the topical report five,  
6 which is 3.5-1. This TR 05 is covered in Revision 17  
7 of DCD in the FSAR 3.3.3, in the section on Combined  
8 License Information. So one major open item is  
9 related to the site which could be destroyed in the  
10 tornado event which could become wind-borne missile  
11 and potentially damage the structure.

12 So this is a very challenging technical  
13 issue as it relates to penetration mechanics. The --  
14 it's known that the geometry shape of the siding does  
15 not fit the spectrum as dictated in Reg Guide 1.76.  
16 The COL Applicant should verify the site conditions  
17 upon the barriers analysis.

18 Second open items related to the Topical  
19 Report 116 on the addition of three heavy water tanks  
20 as indicated in this slide. On the addition of the  
21 heavy water tank would become a missile, a high energy  
22 missile, and its dynamic effect impact on the seismic  
23 containment structure.

24 So, in summary the safety concern is that  
25 because the non-seismic reading is allowed to

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1 collapse, and the consequence of collapse could  
2 generate inbound missiles from sidings and from water  
3 tank and those should be analyzed.

4 Okay, so let's moves to Chapter 3.5.3 on  
5 barrier design against missile attack. We do have one  
6 open item which is also related to missile. The SRP  
7 3.5.3 shows the prediction of local as well as global  
8 damage response of seal and the concrete barriers, due  
9 to missile attack, either internally or externally.

10 And also maybe secondary missile from  
11 scattering of the concrete. In this area there are no  
12 changes for the DCD as approved in the NUREG-1793,  
13 which is Revision 15 of AP1000.

14 So the open item relates to the analysis  
15 concerning the impact of this high energy metallic  
16 wind-borne siding missile. And the concern is it  
17 could compromise the safety of the nuclear structure.

18 And Westinghouse should provide analysis and the COL  
19 Applicant should notify the site conditions found by  
20 this analysis.

21 So in conclusion the DCD Section 3.3 and  
22 3.5.3 are acceptable pending resolution of these open  
23 items. while 3.3.2 has two open items and 3.5.3 has  
24 one open item. Thank you.

25 CHAIR RAY: Thank you. Any questions for

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1 Jerry?

2 All right, we are now magically 10 minutes  
3 ahead of time. So all it took was perseverance.

4 MEMBER ARMIJO: I could ask a question to  
5 slow it down. Just a curiosity on my part.

6 CHAIR RAY: A question.

7 MEMBER ARMIJO: Yes, just a question for  
8 the staff. This issue of tornadoes and high winds,  
9 where are structures like the switch yard and above-  
10 ground electrical facilities, how are those handled in  
11 your analysis, in your review?

12 MR. CHUANG: Basically, the impact of  
13 this collapse -- this so-called one seismic category  
14 building, this annex building, they are allowed to  
15 collapse.

16 MEMBER ARMIJO: You just write it off?

17 MR. CHUANG: Right, so we will contain  
18 the impact of those high energy missiles from the --

19 MEMBER ARMIJO: From the building. Thank  
20 you, Mr. Chairman.

21 CHAIR RAY: All right, thank you.

22 We'll now proceed with Westinghouse once  
23 again beginning I believe with 3.6.3.

24 DCDA CHAPTER 3, SECTION 3.6.3, 3.9.6, 3.11

25 MR. LINDGREN: Well, actually I covered

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1 3.6.3 when I covered piping.

2 CHAIR RAY: All right. I'm just  
3 following the script here. I don't memorize this  
4 stuff.

5 MR. LINDGREN: I know, I pulled a fast  
6 one on your there.

7 CHAIR RAY: Where would you like to  
8 begin?

9 MR. LINDGREN: We are going to go with  
10 3.9.6. These are all related to the Component  
11 Integrity Branch.

12 3.9.6 is a subsection that talks about in-  
13 service testing. Since we have no safety-related  
14 topics it's all about in-service testing of valves.  
15 We added a description of the valve operability  
16 testing to be consistent with the Joint Owners Group  
17 valve program. There is a lot of activity in the  
18 operating fleet on in-service testing and the like,  
19 and we were - we - our major test changes are true-ing  
20 our programs and information up with that.

21 We updated the description of the valve  
22 in-service testing program once again to true  
23 ourselves up with current industry practice after NRC  
24 review and RAIs and the like. We revised and updated  
25 the table of valve in-service testing requirements.

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1 In some cases these are results of design  
2 finalizations. We add a few valves; we remove a few  
3 valves, is primarily what happens, as the designs of  
4 the various systems are optimized.

5 And in some cases there are some RAI  
6 responses.

7 This table is very important because it  
8 really defines the in-service testing program for the  
9 COL applicants. As part of that we updated the list  
10 of active valves, and we revised the COL information  
11 item for in-service valve testing to accurately  
12 reflect that most of the requirements are in fact in  
13 the table.

14 As part of the review of - and in  
15 conjunction with the review of the design specs and  
16 design reports, there was an audit of information on  
17 valid in-service testing, and there are some open  
18 items as a result of that audit that have recently  
19 been included in the SER.

20 CHAIR RAY: You are referring to the  
21 first open item listed here?

22 MR. LINDGREN: Well, they are all really  
23 kind of a result of that. Some are more specific than  
24 others. Just a general one that talks about resolving  
25 the issues from the audit, and as is always the case

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1 the NRC doesn't have the time or the charge to do a  
2 detailed resolution - review of the tables, so we are  
3 doing an extended conditions exercise to see if what  
4 they found is anywhere - exists anywhere else.

5 Then two is reference to static testing  
6 needs to be consistent with the JOG MOV program. We  
7 are preparing a response with that. We need to -  
8 third one, we need to clean up our citation of the  
9 ASME QME-1. We are preparing a response for that.

10 Four is, we have to describe how we are  
11 applying application of Code Case OM-1 in the ASME OM  
12 Code. And our response for that.

13 MEMBER SHACK: And what does that code  
14 case cover?

15 MR. LINDGREN: It's details of how you do  
16 an ISD program as I remember. I think there is only  
17 one code case for the OM Code, and that's it. And  
18 it's been around for awhile. Mostly we need to clean  
19 up how we cited it.

20 Mr. Scarbrough, who just walked in, can  
21 probably tell you.

22 We have to revise the tech specs and tech  
23 spec cases to be consistent with the OM Code. This is  
24 an historical thing. The ASME used to be everybody  
25 referred to Section 11 of the ASME code, which they

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1 referred to the OM Code. Now we refer directly to the  
2 OM Code.

3 And the tech specs haven't caught up with  
4 that. We need an acceptance criteria for check valves  
5 and clarify our response to an RAI response . We have  
6 to clarify a note in our ISD table about the use of  
7 the JOB MOV program, periodic verification.

8 We have to clarify a reference to the OM  
9 Code. You can see that some of these are fairly  
10 detailed.

11 MEMBER BLEY: Yes, right in that area, in  
12 the text that talked about the JOB and the PORV  
13 section, it mentioned doing - calculating risk  
14 importances. It doesn't quite say how to do that.  
15 Because there are various ways to do it. But it also  
16 - I didn't see that it said what to do with it after  
17 you audit it.

18 MR. LINDGREN: Well, we think - we define  
19 the frequency, and in some cases if you get experience  
20 you can reduce those frequencies.

21 MEMBER BLEY: Oh, that's what that was  
22 about.

23 MR. LINDGREN: And that's what that's  
24 about. We do rely on the JOB MOV program. Our  
25 program. As I said much of the changes have been

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1 true-ing our information up with the programs. And  
2 the we did need to address an issue about testing for  
3 the CVS valves.

4 We believe on all of these this is an area  
5 where we have found that the best way to resolve them  
6 is to sit across the table from the NRC, unless we  
7 have come up with some suggested responses and the  
8 like, we will be scheduling a meeting with them to  
9 discuss these.

10 I believe we are done with 3.9.6.ileen,  
11 what is the status of the SER for this section? This  
12 is a lot of open IEs.

13 MS. McKENNA: Well, the status is an SER  
14 with open items that we are awaiting responses to the  
15 particular items that were mentioned, and then staff  
16 will review those responses and hopefully produce an  
17 SER with no open items. I'm not sure exactly where  
18 you were going with your questions.

19 CHAIR RAY: Yes, my question was whether  
20 the SER was issued - it looks like there are nine by  
21 your count, I think we'll get to that later. But I  
22 guess I'm just kind of puzzled by such a long list of  
23 open items that you go ahead and issue the SER.

24 MS. McKENNA: It's a judgment of what's  
25 too many or too large, in order to support issuing it.

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1 I think we felt, yes, maybe the number was a little  
2 large. But I think they are fairly well defined of  
3 what is necessary to resolve them, so that was our  
4 rationale.

5 MR. LINDGREN: We don't believe there's  
6 any real difficult show stoppers.

7 CHAIR RAY: Yes, it's just hard for us to  
8 tell.

9 MR. LINDGREN: Okay, 3.11, environmental  
10 qualification changes. The changes we made in 3.11  
11 was to clarify that Westinghouse is the organization  
12 that is responsible for most of the equipment  
13 qualification, and have revised the COL information  
14 item to that effect.

15 We've also updated Table 3.11-1, a very  
16 large many-page table, for design finalization  
17 efforts, to include valves and equipment that are  
18 added and revised.

19 There is one open item, that came out of  
20 the - once again came out of the audit on design  
21 specs, and design reports. And they looked at this at  
22 the same area and the same time. And asked us to  
23 revise design permit specs to address their comments  
24 on equipment qualification. Again, we will be coming  
25 up with a suggestion on how to resolve this, and

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1 seeking to schedule a meeting with the NRC.

2 And I believe we are done.

3 CHAIR RAY: We are done presenting. I  
4 think if it's all right with you guys, we will take up  
5 these Chapter 8 things that I mentioned at the end of  
6 the staff's discussion, and then your still available  
7 to at least hear them to respond if you wish.

8 We will proceed now with the staff. We  
9 are going to take advantage of the fact that we are  
10 ahead of schedule here. If we can do that.

11 MS. MCKENNA: I think we are ready for  
12 the technical staff for the 3.6.3, 3.9.6 and 3.11 too.

13 CHAIR RAY: Proceed when you are ready.

14 NRC CHAPTER 3 SECTIONS 3.6.3, 3.9.6, 3.11

15 MR. SCARBROUGH: Good afternoon. My name is  
16 Tom Scarbrough. I'm in the component integrity branch  
17 of the division of engineering for NRO, and I'll be  
18 presenting several sections.

19 The first section is one that I'm seeing  
20 here. I didn't work on it directly, but I was going  
21 to walk you through what we did, and if staff, in case  
22 you have any detailed questions. It involves around  
23 Section 3.6 of section, dynamic effects associated  
24 with the postulated rupture of piping, the leak-  
25 before-break issue.

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1 In Revision 16 the documentation is  
2 revised to eliminate the need for COL information  
3 items 3.6-2 and 3.6-3, which address the as-designed  
4 and as-built leak-before-break analysis. Westinghouse  
5 went ahead and did that analysis, and provided in  
6 Technical Reports that the staff reviewed.

7 The staff performed an audit of those  
8 analyses and found the methodology and calculations to  
9 be adequate, and that the as-built results would be  
10 confirmed through ITAAC inspections.

11 The Revision 17 changes the main steam  
12 line, the fuel rods, from SA-333 to SA-335, which  
13 included chromium for these erosion/corrosion  
14 resistance.

15 And the leak-before-break analysis for  
16 this material remains bounding for the AP-1000 DCD,  
17 and we had no open items on this issue.

18 MEMBER SHACK: Do you have to heat-treat  
19 the welds in 335?

20 MR. SCARBROUGH: That's out of my area.

21 MR. REICHEL: Yes?

22 MEMBER SHACK: You have to heat treat  
23 welds in 3.35.

24 MR. REICHEL: Yes, you do.

25 MEMBER SHACK: You do?

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1 MR. REICHELDT: I'm sorry, my name is Eric  
2 Reichelt. I'm a materials engineer for the division  
3 of engineering and component integrity branch one.

4 MEMBER ARMIJO: Okay, good information.  
5 Also on that point the 335 it's a big improvement for  
6 low accelerated corrosion, no doubt about that. But  
7 is there any change in the mechanical properties, the  
8 ductility, fracture duct, things like that, that  
9 reduce your margin on leak-before-break?

10 MR. REICHELDT: The mechanical properties  
11 were the same. The UTS was 16, the yield was 40, the  
12 same as the 333.

13 MEMBER ARMIJO: Okay, good.

14 MR. SCARBROUGH: We will move on to  
15 3.9.6. And this is the functional design  
16 qualification and in-service testing programs for  
17 pumps, valves and then for screens.

18 And the next slide there shows the project  
19 manager and technical staff involved in this review.  
20 And then the next slide is part of an overview of what  
21 3.9.6, what the review is about. It's rather  
22 convoluted because of the fact that you are merging  
23 together a design certification application and COL  
24 application, because this program is an operational  
25 program, and really it's the responsible of the COL

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1 applicant to fully describe it. But in this case we  
2 will talk about why we do a review of the Westinghouse  
3 VCV as well. The VCV itself includes provisions for  
4 functional design qualification of in-service testing  
5 of the pumps, valves and restraints. And in NUREG-  
6 1793 the staff included that the AP1000 DCD was  
7 acceptable for design certification.

8 And that review revolved around design  
9 aspects, not really the operational aspects, but  
10 making sure that there was adequate availability and  
11 accessibility to do the testing and such. And a high  
12 level overview at the program. And that was fully  
13 acceptable under NUREG-1793.

14 Now the Bellefonte FSAR or any lead FSAR  
15 with the COL application incorporates by reference the  
16 AP1000 DCD for the full description and I'll talk a  
17 little bit more about that later. The full  
18 description of the IST operational program. And based  
19 on interactions, Westinghouse is revising the DCD to  
20 address IST issues that are common to all the COL  
21 applicants. We make it just simpler for the reviews  
22 for all of them.

23 And the NRC, we conducted an audit of  
24 Westinghouse of the design of procurement  
25 specifications in October of last year to review the

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1 implementation of that program. And that is part of  
2 the Part 52 requirements of the implementation of some  
3 of these programs.

4 And as a result we have nine open items,  
5 and we'll go through those and I'll tell you what they  
6 are when we get to them. So that is a real high  
7 level. But basically as an introduction the AP1000  
8 DCD includes the provisions that we just talked about  
9 for pumps and valves and restraints, and the DCD  
10 specifies COL information items for applicants  
11 developed IST program per Section 3.9.6, and the  
12 snubber operability program per Section 3.9.3. And  
13 what the Bellefonte application does it incorporates  
14 by reference the provisions of the DCD to help fully  
15 describe this program through a combination of the DCD  
16 provisions and FSAR provisions. So they merge  
17 together.

18 So our review, back when we did NUREG-  
19 1793, we found that the provisions were acceptable for  
20 the AP1000 design certification. It fully satisfied  
21 that high level description at that time.

22 We met with Westinghouse and with TVA back  
23 in March of '08 and talked about the need for the  
24 applicant, the COL applicant, to be able to fully  
25 describe the program per the commission guidance. And

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1 Westinghouse decided that they would revise the DCD to  
2 address these IST issues that are common to all  
3 applicants.

4 So we are currently reviewing the AP1000  
5 DCD, and this is Rev 17, for all those provisions that  
6 help support the COL applications.

7 So we break up the review into sort of two  
8 main areas: one is functional design qualifications;  
9 and one is IST. But what we found through our history  
10 of the motor-operated valve problems over the years is  
11 the foundation of functional design is critical to  
12 make sure these valves can actually be verified during  
13 plant operation. So we do look more closely at  
14 functional design than we ever did before.

15 So the AP1000 provides high level  
16 provisions for functional design qualifications. And  
17 it is noted that there are no safety-related pumps in  
18 the AP1000 design.

19 But they are high level, they talk about  
20 factory tests and things of that nature. But at the  
21 time for design certification it was acceptable.

22 In October of last year we performed an  
23 onsite review to review the design and procurement  
24 specifications, to evaluate how those high level  
25 provisions of the DCD were translated into the specs.

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1 And we - and the memorandum which we issued in  
2 November of '08 we summarized onsite review, and I'll  
3 mention some of the open items we had from that.

4 But that was what we did for functional  
5 design qualifications. Now for the IC program itself,  
6 as we went through and review the Westinghouse AP1000  
7 DCD we had to look and see how the language related to  
8 a full description of the IST program. For example a  
9 DCD might say that we consider - the applicant will  
10 consider this aspect, like a generic letter or such.  
11 But that needs to be fleshed out more for a  
12 description. That's maybe adequate for design  
13 certification, but if you are going to reference in  
14 the DCD FSAR or COL application it has to be more  
15 clear.

16 So some of the places we asked questions  
17 about was to clarify some of the language that was in  
18 there, that Bellefonte was going to be incorporated by  
19 reference. So in response to those RAIs, and there  
20 were a large number of them, Westinghouse modified the  
21 DCD, Rev 17, to include several additional IST  
22 provisions. So through the combination of the  
23 Bellefonte FSAR and AP1000 DCD all those provisions  
24 together are intended to fully describe the IST  
25 operational program per Commission paper SECY-05-0197.

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1           So next, this is just a brief summary of  
2 some of the changes that appeared in the DCD, and this  
3 resulted from the interaction that we had in terms of  
4 coming up with a full description of the IST program,  
5 first as they moved from the former pressure vessel  
6 code, which was the code of record at the time that  
7 the design certification was prepared, into the ASME  
8 OM Code, which is now the new operating code for pumps  
9 and valves and dynamic restraints. So the IST program  
10 description has been transferred over to reference the  
11 more recent code.

12           Next is the testing provisions for the  
13 power up valves, which include motor-operated valves,  
14 has been revised to reference to an Owners Group JOG  
15 program on motor-operated valve periodic verification.

16           And there was a comment about the functional design  
17 qualification, and where that comes into play in the  
18 JOG program is, our program sets up a table based on  
19 level of safety and significance, and functional  
20 margin. And if you have a high safety and  
21 significance, and you have a low margin, you are up in  
22 the category of testing at every outage, and you do  
23 diagnostics. You test the valves with diagnostics,  
24 statically but with diagnostics.

25           And then as you move across the table,

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1 based on your margin or your safety significant risk  
2 ranking, you can extend that out to a maximum of 10  
3 years. For diagnostic testing. You still have to do  
4 your exercise stroking every outage at least, and  
5 maybe even more frequently if it's a high risk valve.

6 But that allows you to extend that interval out.

7 So that is what the Joint industry program  
8 does, and there is also provisions in there for  
9 possible dynamic testing, if you cannot satisfy the  
10 Joint Owners Group program for the historical testing  
11 that was done at all the operating plants for the  
12 Joint Owners Group program, you may be doing dynamic  
13 testing. So there is a provision there for dynamic  
14 testing.

15 So the AP1000 DCD was revised to  
16 incorporate this reference for the use of COL  
17 applicants. And also we'd be happy to have  
18 discussions too because there are other types of  
19 valves, power up valves, other than motor-driven  
20 valves, and there is not a joint industry program for  
21 POVs; there's one for AOVs, which is part of the  
22 discussion, but you need to be able to address those  
23 other type valves as well.

24 Also the provisions for check valves were  
25 expanded to be more descriptive of what's in the ASME

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1 OM code, and that was expanded. It used to be a very  
2 simple reference to the OM Code, but now it's a more  
3 descriptive discussion of that.

4 The IST table, 3.9-16, and all applicable  
5 notes, were updated, because the table was developed  
6 many years ago, and now the changes in some of the  
7 valves and such, and some of the references. So that  
8 has been updated as appropriate.

9 And also there is a new section,  
10 3.9.3.4.4, which addresses snubbers, and the IST for  
11 snubbers according to the new OM Code, subsection  
12 ISTV, which is the latest in that hearing.

13 So those are high level changes that were  
14 made to the DCD.

15 Now the open items, there's a large number  
16 here, but part of the reasoning was that as we went  
17 through we came up with these open items. We knew we  
18 had an audit that we were planning, and we would  
19 proceed with that. Then after that we have been in  
20 the process of processing this. We don't think any of  
21 these are show stoppers; we think we can work our way  
22 through these. But there are a large number of them.

23 First is the resolution of audit followup  
24 items, and one of them was the references to QME-1-  
25 2007. That's the latest standard in terms of

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1 qualification of equipment, mechanical equipment, that  
2 the staff and industry has worked on for over 20 years  
3 to incorporate all these lessons learned from the  
4 Generic Letter 89-10 program. And that is addressed  
5 in the performance specs we found when we did the  
6 audit, but it's not clearly specified in the DCD  
7 itself, so we are working with that, with Westinghouse  
8 on that.

9 Another area is the valve factor for the  
10 motor-operated valves, the frictional requirements in  
11 terms of designing the valves. Some of that was  
12 referenced, and the bases for that needs to be  
13 discussed further.

14 Also the use of QME-1 by vendors that  
15 supply valves to Westinghouse, to the COL applicants,  
16 that discussion too is another area that we do need to  
17 follow up on. So those are the audit items.

18 In terms of the second item there, it's  
19 consistency with appeal would be periodic testing with  
20 the JOB program. There was language in the DCD which  
21 talked about static testing. And one of the areas is  
22 we need to make sure that the potential for dynamic  
23 testing is recognized, because the job program does  
24 have that provision in it if you don't satisfy the  
25 provisions in the program. And we wanted to make sure

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1 that was very clear, because the DCD is going to be  
2 read and used by people many years in the future. We  
3 want to make sure it's very clear as to that  
4 relationship between static and dynamic testing.

5 So we need to make sure that is clear  
6 before we go forward.

7 The next is - this came through the RAI,  
8 but it's the same issue in terms of QME-1-2007  
9 reference in Section 3.9.2.9. It's actually  
10 referenced in the latest version of the DCD back in  
11 like Chapter 5, for system components, but we think it  
12 would be important to reference it up in 3.9 as well.

13 Next is the use of ASME OM Code Case OMN -  
14 1, and that code case was the result of the  
15 determination that the stroke time testing in the ASME  
16 code was inadequate to demonstrate the design  
17 capability or the operational readiness of motor-  
18 operated valves. And through working through ASME,  
19 this code case allows the replacement of the stroke  
20 time testing, or quarterly stroke time testing, with a  
21 longer interval testing of the motor-operated valves  
22 with diagnostics based on the margins that they have.

23 And the NRC has endorsed and accepted the Revision 0  
24 of the OMN-1 code case in Reg Guide 1.1.9.2. There is  
25 a new version which I think is a better version of

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1 OMN-1 Rev 1, but we haven't worked our way through the  
2 process to endorse it yet in Reg Guide 1.2.9.2, but  
3 we think that is soon to come up. We need to make  
4 sure that this reference -- the reference that is  
5 already approved in Reg Guide 1.9.2, or that there is  
6 an alternative submitted. Because you can't use a  
7 code case that is not already approved unless you  
8 provide an alternative. So that is open item number  
9 two - open item four.

10 Open item number five is consistency with  
11 the tech specs, and when the tech specs were updated  
12 to OM Code, most of the places properly translated the  
13 boiler and pressure vessel code reference to the OM  
14 Code reference, but there were a few scattered places  
15 where it didn't get picked up. It was like in notes  
16 or references, that sort of thing. So that is a  
17 little bit of clean up area that we noted and that  
18 needs to be done.

19 Open item six is the check valve test  
20 acceptance criteria. We asked about this in the RAI.

21 And the RAI response talked a little bit about  
22 ensuring that the test checked out test acceptance  
23 criteria with fully demonstrated opening, have proper  
24 pump indication of flow, the way good acceptance  
25 criteria, but we thought that needed to be more

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1 clearly specified in the DCD, but in an RAI response  
2 we can't really rely on it in the SER. We can only  
3 use it to clarify information that is already in the  
4 DCD. And we need to work with them on that to see  
5 where the DCD itself can be strengthened so we can  
6 rely on that.

7           Next is open item seven, and this has to  
8 do with the power-operated valves I talked about. We  
9 issued Regulatory Issue Summary 2000-03, which talked  
10 about all those power-operated valves that are other  
11 than motor-operated valves. And in there we  
12 incorporated a list of attributes which we considered  
13 to reflect the lessons learned of all the motor-  
14 operated valve programs. And what we would like to  
15 talk to Westinghouse about is they can - some of that  
16 information, some of those lessons learned, more  
17 clearly indicated in the DCD. So we will be working  
18 with them on that.

19           Open item eight is a clarification of the  
20 OM Code for exercise testing. An RAI response  
21 indicated that the remote position indication in ISPC  
22 3700, which is one section of the OM Code, will be  
23 used to verify the fail safe operation, and we just  
24 need to make sure that's clearly indicated in the DCD.  
25       So we'll be doing that.

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1           And then there's item nine is sort of cats  
2 and dogs. There were long lists of tables. Because  
3 it's such a long table for ISD, so many valves in  
4 there, and there's been so many notes that have to be  
5 addressed to all those valves. There were a few  
6 places that needed to be clarified. There was a  
7 reference to Appendix J testing, and we talked about  
8 that, about the safety functions, and how you rely on  
9 Appendix J for safety functions. Plans for a  
10 particular certification of a note on PRA, and a  
11 reference to some valve categorization. Some minor  
12 issues in there to deal with that we have to resolve.

13           So those are the open items. So where do  
14 we go from here? What do we have left? The remaining  
15 review items are, we have to address the audit follow  
16 up items. That was something that when we left the  
17 audit, that was something that we agreed that, that we  
18 would go back and think about those items, and we  
19 would meet in the future and resolve those. So we  
20 need to close out those audit items. We need to do a  
21 follow up audit to see how those were addressed. But  
22 we'll talk about that. We'll resolve those open  
23 items; there's nine items, and we think, as was  
24 mentioned, this takes I think just sitting down face  
25 to face and working our way through those. And then

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1 finally to confirm that the DCD and the Bellefonte  
2 FSAR consistent to provide that full description of  
3 function, design and qualification of these programs  
4 in support of the COL application.

5 So that's where we go from 3.9.6. So any  
6 questions on 3.9.6 before we move on?

7 CHAIR RAY: Hearing none.

8 MR. SCARBROUGH: So 3.11 is EQ, and the  
9 next slide. 3.11 I focus mostly on the mechanical  
10 side of EQ, but once again here's the overview. The  
11 DCD includes provisions for environmental  
12 qualification, EA, of mechanical and electrical  
13 equipment. NUREG-1793 concluded that the DCD was  
14 acceptable for design certification. The Bellefonte  
15 FSAR incorporates by reference the AP1000 DCD for a  
16 full description of each operational program. Once  
17 again this is another operational program. And the  
18 Westinghouse changes to the DCD in the EQ area do not  
19 impact NUREG-1793 approval, and I'll relate some of  
20 those in just a minute. And the audit we did conduct  
21 in October of last year also covered the EQ aspects;  
22 we looked for the EQ aspects as well while we were  
23 there. We ended up with one open item.

24 Okay, so once again, the introduction to  
25 AP1000 DCD includes the provision for EQ, the DCD does

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1 specify that the COL information item for equipment  
2 qualification file - and I'll talk more about that in  
3 a minute - then the COL application incorporated by  
4 reference the DCD, don't fully describe the EQ  
5 operational program.

6 So the NRC review - the NRC found DCD  
7 provisions for EQ mechanical and electrical equipment  
8 to be acceptable, and we are reviewing the DCD  
9 provisions to help support the description for the COL  
10 applications. And in October of last year review  
11 audit onsite review also covered the 3.11 areas, and  
12 will be resolved as part of the whole 3.9.6 review.

13 Now here is the summary of the AP1000 DCD.

14 I found going through that Section 3.11.5 was revised  
15 to specify that Westinghouse will act as the agent  
16 during EQ phases with the COL holder defining the  
17 process or procedure for EQ files. So here is a  
18 change where Westinghouse is acting more as an agent  
19 to hold those aspects, and that was part of the  
20 process for the valves as well, painting the valves,  
21 qualifying the valves, acting as an agent, and that is  
22 spelled out in this section, 3.11.5. The EQ table --

23 CHAIR RAY: That is an odd thing. I mean  
24 the agency is a commercial relationship. Why is it in  
25 here? Maybe there is a good reason for it when I

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1 think about it. But supposing they decided to have  
2 somebody else do it?

3 MR. CUMMINS: This is Ed Cummins. I  
4 think the SU really was, used to say that the COL  
5 holder would be responsible for everything. They  
6 didn't want to be.

7 CHAIR RAY: That's fine, but why does it  
8 have to be in the DCD? That's the business between  
9 you and your customer.

10 MR. SISK: I think part of that answer  
11 would also fall into the ITAAC. You are completing  
12 some of the ITAAC, the EQ ITAAC as part of a  
13 qualification program, one time up front, as we do  
14 this. So they looked at the audit last year in  
15 procurement space, each customer would not go back and  
16 do a new EQ program for valves and equipment that have  
17 been qualified at one point in time.

18 CHAIR RAY: Well, that's not what this  
19 says, but it may be why you did it. I think it is not  
20 something we should spend our time on. It just seems  
21 a very odd thing to have the NRC build into the DCD  
22 something that is basically a commercial relationship  
23 between the COL holder and whatever he wants to use.  
24 Anyway, go ahead.

25 MR. SCARBROUGH: As I mentioned, the HQ

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1 table was expanded or updated. The EQ scope itself  
2 was expanded in Section 3.V, which is sort of this  
3 methodology for EQ, to include the seismic category  
4 two equipment.

5 The Reg Guide 1.9.7 was referenced as  
6 updating another Reg Guide for plant instrumentation.

7 Section 3(b).6.3 was revised to specify that the  
8 operating experience is not employed as part of the EQ  
9 program, for qualification. And a section 3(b).5.5.1  
10 was revised to address NUREG-1465 and Reg Guide  
11 1.1.8.3 on accident source terms.

12 So those were the changes, and so there is  
13 not a significant amount of changes from our  
14 perspective, from our review. And so the remaining  
15 items we have, the changes to the DCD do not impact  
16 our NUREG-1793 review. We need to address the audit  
17 follow up items, and part of that is confirming the  
18 operational aspects as the initial EQ is transferred  
19 over o the applicant. We need to make sure that  
20 transition is a transition phase there, and that's  
21 clear, and make sure that EQ specs are allocated, as I  
22 mentioned about the vendor for QME-1. And then  
23 confirm that the DCD is consistent with the Bellefonte  
24 FSAR to help support the full description of EQ  
25 programs. So that's where we are with 3.11.

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1 CHAIR RAY: Any questions?

2 Okay, that concludes the set agenda.

3 SUBCOMMITTEE DISCUSSION

4 CHAIR RAY: As I mentioned, we have a need  
5 to talk about Chapter 8 that was discussed yesterday,  
6 and then we have discussion among committee members  
7 before we conclude the day.

8 I perceive that we would be better served  
9 to take our break now and come back and do that.  
10 Since we are ahead of time, we will resume at 2:45.

11 (Whereupon, the above-entitled matter went  
12 off the record at 2:30 p.m. and resumed at 2:43 p.m.)

13 CHAIR RAY: We are going to now again I  
14 want to express my gratitude to my colleague here  
15 while I was trying to keep this hearing on time, he  
16 was able to go through information sent by our fellow  
17 member concerning Chapter 8, and we think it's  
18 important to make note of a few items, many of his  
19 comments to us were covered during the discussion; a  
20 few were not. And we'd like to make note of them.  
21 Either applicant or staff can respond. At least we  
22 have the time to receive the response, but there is no  
23 expectation or obligation to do so.

24 And they will then be carried over as  
25 appropriate if need so. So I'd like to turn it over

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1 to Dennis now to let us know what it was that needs  
2 further response to what we've gotten from our  
3 colleague here on Chapter 8.

4 MR. SISK: Mr. Chairman, if I may, is  
5 Westinghouse on the line?

6 Is Mark Demaglio on the line please?

7 MEMBER BLEY: They might be muted in  
8 here.

9 MS. LI: He is there.

10 (Off the record comment.)

11 CHAIR RAY: These are just comments that  
12 we have extracted from input aids provided originally  
13 to me, and then I asked Dennis to take a look at it,  
14 and he will pass along what he thinks is still in need  
15 of some response.

16 (Off the record comment.)

17 MEMBER BLEY: We can take just a minute.

18 MR. LI: We are ahead of schedule.

19 (Off the record comment.)

20 MEMBER BLEY: Well, let me just introduce  
21 this until they show up. John wrote a number of  
22 detailed comments as he reviewed Chapter 8. And most  
23 of them were addressed yesterday in the presentation  
24 and discussions.

25 Is somebody on the line?

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1 (Off the record comment.)

2 MEMBER BLEY: Is this Mark from  
3 Westinghouse?

4 All right, we got some feedback, Mark.  
5 It's echoing.

6 (Off the record comment.)

7 MR. SISK: Mark, could you identify  
8 yourself for the record, please?

9 (Off the record comment.)

10 MR. SISK: Mark, continue to listen in  
11 and we will continue on.

12 MEMBER BLEY: Here are two questions that  
13 were not addressed. He raised some questions about  
14 the batteries and the chargers, and noticed that with  
15 the change to the 250-volt where you put two 125-volt  
16 batteries in series, that led to some complications in  
17 switching and arranging, and he raised some questions  
18 with respect to the spares. And let me read what he  
19 said.

20 Section 8.3.2.1.2 confirms that the Class  
21 I E spare battery series disconnect switch is opened  
22 when the battery is connected to a non-class 1E bus.  
23 Please explain how the spare battery and a battery  
24 charger are connected to a Class 1E bus and to a non-  
25 class 1E bus. Also, what design features, interlocks

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1 or other practices preclude switching errors on this  
2 connection.

3 So I don't know whether you want to  
4 address that one now or later?

5 MR. CUMMINS: I think we can address it  
6 now. This is Ed Cummins. The concept of the spare  
7 battery was - it could be used to replace any of the  
8 batteries in the plant one at a time. And so if you  
9 think about this it could be quite complicated by  
10 train separation, because whenever it's a division of  
11 safety-related, INC-related, because whenever it's  
12 hooked up it's the division that it's hooked up. So  
13 sometimes it's A, sometimes it's B, sometimes it's C,  
14 sometimes it's D, and then sometimes it's the non-  
15 safety.

16 So we have let's say a spare battery  
17 control room where wires have been - or cables have  
18 been pulled from the A, B, C and D and the non-safety  
19 batteries. And they are disconnected. So nothing is  
20 connected normally, except the charger to the  
21 batteries. So if you want to connect it you can only  
22 connect, you can have interlocks, so that you can only  
23 connect one source.

24 MEMBER BLEY: So that is a physical  
25 interlock?

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1 MR. CUMMINS: Yes.

2 (Off-mic comment.)

3 MR. SISK: Mark, can you call in on  
4 another line?

5 MR. DEMAGLIO: I can try.

6 MR. SISK: This is breaking up badly.

7 MEMBER BLEY: We don't have a figure  
8 either.

9 CHAIR RAY: By the way, before we resume,  
10 you used the word, you can have interlocks. And  
11 Dennis I think then asked a question that sounded like  
12 you did have interlocks. What is the status of the  
13 design?

14 MR. CUMMINS: Well, Mark is the right one  
15 to answer. But I believe that the way you do the  
16 physical interlock is the actual detailed design of  
17 this battery intake valve is conceptual. So it's  
18 functional. But typically the interlocks in  
19 electrical are I'll call them kirk-key interlocks is  
20 what I know, and you can only have one key connected  
21 to one thing.

22 MR. DEMAGLIO: Hello.

23 MEMBER BLEY: Try to say a few words,  
24 Mark, it didn't sound much better.

25 MR. DEMAGLIO: Okay.

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1 MEMBER BLEY: I don't think it'll work.  
2 I think we'll have to hear back from you.

3 CHAIR RAY: It may be a problem on our  
4 end.

5 MR. CUMMINS: Stay on the line, Mark,  
6 because it is important that you hear this anyway.

7 MEMBER SHACK: Squawk if you're really  
8 unhappy.

9 MR. CUMMINS: So the spare battery is -  
10 all of the batteries have two banks of batteries that  
11 supply 125 volts, and sometimes you connect them in  
12 parallel and sometimes you connect them in series, and  
13 if you connect them in series that provides a battery  
14 with 250 volts. So if you wanted to have a spare - if  
15 you wanted to make the spare battery substitute for  
16 one of the 125-volt non-safety batteries, then you  
17 would want to connect it in parallel instead of in  
18 series, so you would have to have some sort of switch.

19 (Off mic-comment.)

20 MEMBER BLEY: We can't understand you.  
21 I'm sorry, you are just going to have to keep notes.

22 (Off-mic comment.)

23 MEMBER BLEY: I think we are going to  
24 have to ask you not to talk, because it is  
25 unintelligible. But go ahead.

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1 MR. CUMMINS: I think he is saying there  
2 is some description of this in the DCD, in Chapter 8  
3 of the DCD.

4 MEMBER BLEY: I think our point was, it  
5 appeared to be conceptual, and what we'd like to  
6 eventually see and we hope staff will keep as some  
7 kind of an open item until it's finished is the  
8 details such that we can know if it's physically  
9 impossible to do this in wrong way, like hook up two  
10 at the same time, or if it's procedurally done, so  
11 it's the detail there that matters.

12 MR. CUMMINS: The details of the battery,  
13 the spare battery interlock system, is what you are  
14 asking for?

15 MEMBER BLEY: Yes, and how that ensures  
16 that you won't --

17 CHAIR RAY: Well, either that, or in the  
18 absence of details, something that would serve in  
19 place of the details, like we sometimes do.

20 MEMBER BLEY: Which could be an ITAAC.

21 CHAIR RAY: Right.

22 Does the staff have any comments on this  
23 point?

24 MR. CHOPRA: Om Chopra from the  
25 electrical engineering branch. I really don't have

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1 the drawings. But yes, I did not --

2 CHAIR RAY: You don't need to make a  
3 comment if you don't feel like you are ready.

4 MR. CHOPRA: But all I know is that the  
5 interlocks are provided, so that the spare battery  
6 will be connected to the inoperable battery and  
7 nothing else.

8 MEMBER BLEY: Okay, so it's been thought  
9 about, but we don't know what the details are.

10 MR. CHOPRA: Yes.

11 MEMBER BLEY: Our concern is that we  
12 understand conceptually that's what's there. Until it  
13 is actually realized in hardware it's possible it  
14 won't do what the claim is.

15 The next one he raised a question on had  
16 to do with --

17 MR. CUMMINS: Can I - we are reading -  
18 where are we? 8.3? It says a single battery bank  
19 with a spare battery charger is provided for Class 1E,  
20 B, C, and UPS system. In case of failure or  
21 unavailability of normal battery bank, when the  
22 battery charges, permanently installed cable  
23 connections allow the spare to be connected to the  
24 effective bus by a plug in locking type disconnect  
25 along with a kirk key interlock switches. Plug-in

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1 locking type disconnect, and kirk-key interlock  
2 switches permit the action of only one battery or  
3 battery bank and charger at the time, so the  
4 independence of each battery division is preserved.  
5 The spare battery and the battery charger can also be  
6 utilized as a substitute when offline testing,  
7 maintenance and equalization of operational battery  
8 pack is desired.

9 MEMBER BLEY: Okay, thank you. I think  
10 that takes care of it. John hadn't found it, and I  
11 didn't spot it.

12 The next one has to do with the aux  
13 boiler. You talked about that a bit yesterday, but  
14 the question John raises is more an operational one.  
15 Why is the aux boiler, the electric aux boiler,  
16 supplied through a separate unit auxiliary  
17 transformer, and a bus that cannot be connected to the  
18 reserve aux transformer? How does this design affect  
19 auxiliary steam supply to plant loads if the unit  
20 shutdown and maintenance is required on the main  
21 transformer, the isolated bus or the switch section  
22 hooked to the main transformer.

23 MR. CUMMINS: Ed Cummins again. Why is  
24 it a separate winding? I believe it's a separate  
25 winding because it's voltage and its capacity is more

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1 than what could be accommodated by the normal division  
2 - but how do you work it when the plant is offline?  
3 Well, normally, when the plant is offline, the unit  
4 auxiliary transformers are supplied from offsite,  
5 power, and it steps it down to the isophase bus volt  
6 is 22kV, whatever it is. And all the loads are  
7 supplied from unit aux transform. So normally when  
8 the unit is shutdown you have complete capability from  
9 this other transformer to supply the aux boiler .

10 Now what I suppose part of the question  
11 seems to be why didn't you think you needed to have  
12 another reserve source for that.

13 MEMBER BLEY: In case you are doing  
14 maintenance on that particular transformer.

15 MR. CUMMINS: I think the answer there is  
16 that one of the utilities comments we had was that  
17 maybe we could get rid of this. I mean this is not a  
18 device which is often used, and so we decided not to  
19 get rid of it, to supply it, but to supply it - it  
20 doesn't need to be supplied in a way that it is super-  
21 reliable, because the only time you would use it is  
22 when you shut down and don't have any steam, and need  
23 heating of the building.

24 MEMBER BLEY: Okay, thank you.

25 The next one is kind of two of his put

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1 together, but he built a couple of tables from DCD  
2 Rev. 15 and 17, looking at power ratings for certain  
3 components, and they include service water pump,  
4 component cooling water pump, normal RHR pump,  
5 containment recirc fan, and the CRDM fan, and the DC  
6 division to supply motor-operated valves, and these  
7 ratings, some he couldn't find ratings originally, but  
8 some of the ratings on the pumps and fans changed by  
9 about 20 - 25 percent, and some of the ratings on the  
10 motor-operated valve divisions changed by a factor of  
11 two, and he was just wondering why did these change so  
12 much? Have you added a lot more loads somehow? Or  
13 changed the motors? How come they changed so much, or  
14 is it just one of those design finalization things  
15 we've been hearing about?

16 MR. CUMMINS: Well, Ed Cummins again.  
17 Let's take the motor-operated valves first. We were  
18 talking about this subject earlier today when we  
19 talked about all these joint owner group studies at  
20 EPRI and NRC too studies on valve operability. And  
21 the net effect of all those on the operating class was  
22 they had to go take their valve operators and put  
23 bigger motors on them because there was not enough  
24 margin, and there were issues of torque switches and  
25 other things that didn't assure performance under the

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1 worst conditions.

2 So as we finalize the design we actually  
3 go through the - I think it's actually an EPRI  
4 methodology to size the motors in accordance with the  
5 rules that came out of this motor study. And it's not  
6 surprising to me that some motors doubled in size  
7 because they probably would have operated with the  
8 first size, but if you have all the things go wrong,  
9 you need twice the size.

10 MEMBER BLEY: Getting past the torque  
11 switches and the like? Okay, thank you. So it really  
12 is a calculational improvement?

13 MR. CUMMINS: It is.

14 MEMBER BLEY: And a low margin thrown  
15 in.

16 MR. CUMMINS: And I would say on the  
17 other ones, that is design. Twenty percent doesn't  
18 sound too bad to me in terms of design finalization,  
19 sizing differences. And we get some even without  
20 them, because we are not sure.

21 MEMBER BLEY: He didn't find that. And  
22 he is usually pretty thorough when he chases something  
23 like that.

24 Okay, there's only a couple of more of  
25 these. When you talk about the standby diesel

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1 generator, you talk about that it is tested to verify  
2 its capability to provide 4,000 kW. Duration will be  
3 the time required to reach equilibrium plus 2-1/2  
4 hours. And John asked, why don't you need a 24-hour  
5 full load test to demonstrate capacity?

6 MR. CUMMINS: Ed Cummins. I don't know  
7 the answer to that.

8 MEMBER BLEY: I don't know if there is a  
9 usual requirement. Maybe staff has a comment on this  
10 one.

11 MR. CHOPRA; Om Chopra from electrical  
12 engineering branch.

13 In the current design the diesel  
14 generators are an emergency power source. So we do  
15 require that they should be endurance test, so we  
16 require a 24-hour test for those diesel generators  
17 currently in operating plants.

18 But for passive design there are no tech  
19 specs really for these diesels.

20 MEMBER BLEY: So you're happy with the 2-  
21 1/2 hour?

22 MR. CHOPRA: Pardon me?

23 MEMBER BLEY: You are happy with a 2-1/2  
24 hour at equilibrium.

25 MR. CHOPRA: Like I said, they don't have

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1 any tech specs that we can look at, and we can make  
2 them do anything, because these tech specs they have  
3 are really not related to safety-related equipment.

4 MEMBER BLEY: The RTNSS things?

5 MR. CHOPRA: The RTNESS, yes.

6 MEMBER BLEY: Does that come under the  
7 RTNSS discussions you still have going on?

8 MR. CUMMINS: Yes.

9 MEMBER BLEY: Here is one more thing to  
10 think about.

11 MR. CUMMINS: Ed Cummins, I have a  
12 comment on that. We specify tests of all things in  
13 Chapter 14, and so if we wanted - if we needed, if we  
14 felt we needed a longer test, you don't need it to be  
15 in tech specs, and we don't want it in tech specs,  
16 because it is not essential to the safety of the  
17 plant. But if you wanted a 24-hour test or needed a  
18 24-hour test, in order to feel confident of the  
19 performance.

20 MEMBER BLEY: That's the end of the  
21 questions. There were a couple of others, but we  
22 resolved those. One of them is going to come up under  
23 one of the other chapters, Chapter 7 we'll get to.

24 CHAIR RAY: Thank you very much, Dennis,  
25 I truly appreciate it.

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1           Okay, now we still don't have the  
2 applicant at the table, and we have the staff here.  
3 Is there is any thing that a member has just thought  
4 of that needs to be directed to either party, speak  
5 up, otherwise I will go around the table, and we will  
6 have a discussion among the members.

7           MEMBER BLEY:       One thing came to mind  
8 during the last set of staff presentations. It sounds  
9 as if there is going to be a need for a Rev 18 to fix  
10 the DCD with respect to the agreements that have been  
11 made between the applicant and staff, and I'm just  
12 wondering, have you got any assurances that there  
13 aren't going to be another set of wholesale changes  
14 because of other things, or - requests from the  
15 customers?

16           MR. CUMMINS:    This is Ed Cummins. First,  
17 my helpers have shown me where we do have a 24-hour  
18 test.     In Chapter 16.3, 16.3 is kind of an  
19 availability requirement for RTNSS components in  
20 certain configurations like in the MISP that requires  
21 certain of the equipment to be operable when you are  
22 in certain situations. And one of them is the diesel  
23 generator, and this says, they are written kind of  
24 like tech specs, but the consequence says notify the  
25 chief nuclear officer rather than shut down. So it's

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1 a little bit less consequence.

2 But in SR 3.1.4 it says, verify that each  
3 standby diesel starts and operates - this is a 10-year  
4 repeatable test - operates at 4,000 kW for greater  
5 than 24 hours. This test may be utilized in diesel  
6 engines prior to starting. They warm up-period prior  
7 to load both diesels, will be operated at the same  
8 time during this testing.

9 MEMBER BLEY: Fair enough. Thank you.

10 (Simultaneous speakers.)

11 CHAIR RAY: How the things, since the  
12 issuance of 17, are going to be documented.

13 MR. CUMMINS: So fortunately we  
14 recognized this awhile back, that we had some comments  
15 from the staff that if you continue to change the  
16 design continuously how could we ever evaluate it.  
17 And we thought about that, and we said, well, we have  
18 to fix that. And it's a licensee responsibility to  
19 fix that. And so we established a design freeze for  
20 licensing purposes, in August of 2009. And then we  
21 submitted Rev 17 in September. So we took all the  
22 changes we knew about that were approved before that,  
23 put them in and said okay, all - from there on --

24 CHAIR RAY: Did you mean 2009?

25 MR. CUMMINS: 2008, I'm sorry.

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1 CHAIR RAY: I was going to say.

2 MR. CUMMINS: So what does that mean?  
3 What it means in our kind of agreement with the staff  
4 is that they will not see changes in the design that  
5 they haven't already seen in an RAI response or in  
6 some other kind of communication. So if there are  
7 other changes to the design that are not already  
8 communicated to them in the context of an RAI  
9 response, then those changes will be implemented into  
10 the licensing with what we call departure. And so  
11 they all will be in the certified AP1000 design. They  
12 will be in either the CMO designs or if the COLs  
13 provide, they could be say 50.59 type changes that  
14 occur after the COLs.

15 But so --

16 CHAIR RAY: Well, how does the DCD get  
17 conformed to the 17-plus RAI responses? What is just  
18 the administrative mechanism?

19 MR. CUMMINS: So that becomes you have  
20 18, obviously. And you have 18 - conceptually it's  
21 coming in the near term. Many of the RAI response -  
22 requests have nothing to do with design change, but  
23 say, I want you to write in the DCD something that  
24 assures the staff that this is true. And in some  
25 sentences to write there, or need some concept of

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1 sentences to write there. So there are many changes  
2 that we have agreed upon with the staff not related to  
3 changes but related to staff needs for confirmation of  
4 commitments in the DCD.

5 So what we do when we write the RAI is we  
6 draft the change to the DCD as part of the RAI  
7 response, and we send it to the staff, and if they  
8 don't like it we have further dialogue, and if they  
9 like it they are fine. So we have a whole pile of  
10 these changes that have nothing to do with design  
11 changes, they have to do with licensing changes as a  
12 result of our process with the staff. And sometimes  
13 if we could conclude on those a related design change  
14 that made sense, we did, and if the staff didn't like  
15 it they would communicate back to us, which hasn't  
16 occurred to my knowledge.

17 But if we didn't have an RAI interaction,  
18 then we took this departure process. So we have I'll  
19 say 50 - but I could be off by plus or minus 15.

20 MR. SISK: Ed, just additional  
21 clarification on that if I can. As indicated - Rob  
22 Sisk, Westinghouse - as Ed indicated from the freeze  
23 date if you will of August, 2008, we have at least  
24 been following along a process with the staff of  
25 basically looking at conforming items. We haven't

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1 talked about confirmatory items. Many of the  
2 confirmatory items that the staff has identified  
3 requires us to incorporate changes to the DCD test.  
4 The one item I want to add for clarification, as we go  
5 through each change, or as we look at evaluating  
6 potential changes, we work with the staff, obviously  
7 with the RAIs, and make sure that those changes are  
8 responsive to the staff needs.

9 But if we have anything that falls outside  
10 the RAI, we also look at ISG-11, the Interim Staff  
11 guidance, 11, which is on the guidance, and that sets  
12 up about a five-step screening process which says,  
13 these are things you must tell us about, these are  
14 things that can be potentially deferred to a later  
15 date at the option of the COLs and at the option of  
16 time going forward.

17 So there is a process in place that the  
18 staff has established with ISG-11 that we are using as  
19 a framework on which to evaluate changes as we go  
20 forward. Right now the purpose of Rev 18 is a  
21 conforming document to address staff needs.

22 MEMBER BLEY: All right, one last  
23 question in this line. Is this design finalization  
24 process far enough along that you are reasonably  
25 comfortable you won't be seeing a lot more things

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1 popping up?

2 MR. CUMMINS: Well --

3 MEMBER BLEY: You've looked at most  
4 systems now?

5 MR. CUMMINS: Well, the design, I don't  
6 know what to say. The design finalization I'd say we  
7 are between 70 and 80 percent complete with the  
8 design. But we have proposals for design changes that  
9 we disposition weekly. And so we are - we have  
10 candidates for departures that we look at and evaluate  
11 weekly, and we do that in conjunction with our  
12 customers. But everybody thinks about this together  
13 as something that we need. So we are still changing  
14 the designs, but we are not changing the license, and  
15 there is a process to change, to make it conforming  
16 ultimately, as a COL responsibility.

17 I would say, talking about Rev 18, the  
18 time you want to issue it to the staff is sort of at  
19 the point where you don't have any significant  
20 interaction with them in RAIs, because the real  
21 drivers for the changes that they want to see us make  
22 are the RAIs, and if the RAI comes the day after you  
23 submit the Rev 18, then it's the reason for Rev 19.

24 MEMBER BLEY: We understand that.

25 MR. CUMMINS: Yes, so we are talking not

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1 too far from now, early next year or late this year,  
2 to Rev 18, somewhere in there, and Rob and I don't  
3 even agree, but we have to talk to all of our  
4 constituents, our customers, and the staff, and we  
5 have to come up with a common view of when it's  
6 appropriate.

7 CHAIR RAY: Okay, well, trust me when I  
8 tell you that the very last thing we want to see is  
9 Rev 18. Aside from that at least it's legitimate to  
10 think about this thing called Rev 18, which I would  
11 think of as a conforming change that doesn't have any  
12 new information in it that hasn't been previously  
13 vetted with the staff.

14 The two of you used change in at least  
15 three different ways: one, design change; one change  
16 in the text; and the third one I heard was change in  
17 the license. One of the problems we are having, and  
18 why Sanjoy is holding his head right now, is that we  
19 are trying to figure out how we can focus on design  
20 changes, and not be bogged down in text changes and  
21 license changes, and we haven't figured that out yet.

22 And Ed, I promised you I would invite you  
23 to tell us if you have a way to do that. But what we  
24 crave is the ability to recognize changes in the  
25 design that can be aggregated into topical areas, for

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1 review. The process that we deal with isn't directly  
2 with you, it's really a function of how staff does  
3 their work. But nevertheless that is the dream that  
4 we have is that we can somehow focus on design  
5 changes, and pay attention to those, at least as our  
6 first priority.

7 Do you have any thing you want to offer?

8 MR. CUMMINS: This is Ed Cummins. I  
9 think we have to feel this out a little bit. But we  
10 know what our design changes are. We have a very --

11 CHAIR RAY: I'm sure you do.  
12 Unfortunately, we're in the other direction. We are  
13 trying to figure out the design change from the text  
14 change.

15 MR. CUMMINS: So the question to us is,  
16 is there a way that we can reasonably communicate what  
17 we know to you to be helpful without being I don't  
18 know - and still be in the proper regulatory  
19 framework, working with the staff and you. And I  
20 think that we have to talk to the staff and you, but  
21 we wouldn't mind making it, as we submit each chapter  
22 to the ACRS for full review, making a one-page summary  
23 of the design changes that we think apply to that  
24 chapter that are impacting the chapter or in a  
25 sentence about why we made the change.

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1 CHAIR RAY: Well, to some extent the  
2 change matrix that we had did that, but it was at the  
3 wrong level, the wrong altitude. And so without  
4 asking to solve the problem here, I just want you to  
5 know that - I'm sure you not only know what your  
6 design changes are, you've got them numbered, and you  
7 know which design change has got which number to it,  
8 and which revision of that design change you are  
9 talking about at any time. I'm sure you've got those  
10 books. Unfortunately they are not transparent to us,  
11 and that's because we are driven by the consequences  
12 of the design change in terms of the text and the fact  
13 that the way the staff approaches the DCD is based on  
14 chapters, and the text and the chapters.

15 So you lead to that - I mean you wind up  
16 with something like that matrix, which you know is a  
17 valiant effort to try and get some clarity, but it  
18 just became something we couldn't process effectively.

19 But we are struggling, so now maybe you will hear  
20 some more or that here, just be patient with us. We  
21 will go around and get any further comments members  
22 have. I'll ask Mike to take notes so we can recreate  
23 this.

24 MR. CUMMINS: We are willing to do some  
25 incremental value added thing as long as it's proper.

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1 CHAIR RAY: We appreciate that, and I  
2 trust you understand it would be in your interest as  
3 well as ours if we can somehow live with this more  
4 functionally and less text driven than we do.

5 Okay, with that, Sam didn't have a chance  
6 to comment yesterday. Others of us did. Bill, do you  
7 have anything you want to say further?

8 MEMBER SHACK: No, it just seems to me  
9 that most of what we've seen today seems to be in  
10 process of getting done. And this is going along - I  
11 don't see any show stoppers here. The one that is a  
12 little surprising is the difficulty in still working  
13 out what the proper requirements are for RTNSS  
14 components. Maybe this is when the rubber is meeting  
15 the road on RTNSS, and it just has to be worked  
16 through.

17 CHAIR RAY: Is there a topic that we  
18 should try and address in any generic way internally  
19 between us and the staff? I'm just getting up to  
20 speed on it. I basically understand the principle,  
21 but I can't be an authority on it.

22 MEMBER SHACK: The staff and the licensee  
23 can work that out. But it seems to me that is going  
24 to be a problem sort of over and over again until we  
25 get a better process. It seems to me conceptually

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1 when RTNSS was invented it was going to work all  
2 right. You'd look at the PRA, you'd see what  
3 functions were really important, and then you'd go and  
4 you'd test or you'd verify those functions.

5 Now that doesn't seem to work out as  
6 easily in practice as it did in 1994, so when the  
7 concept was invented but I don't know that we have  
8 anything to add to the conceptual stage, and we'll  
9 just sort of have to see how it works out as we go  
10 along.

11 CHAIR RAY: Well, your judgment would be  
12 far better than mine. It's just that it would seem  
13 like it might merit, given the time that has passed,  
14 revisiting what were we thinking of, and how is it  
15 seemed to be working, and is there any input that we  
16 have on the subject. Just a thought.

17 Sanjoy?

18 MEMBER BANERJEE: I think you spoke of  
19 something which is how to aggregate things which are  
20 the consequences of these design changes into areas  
21 which are let's say a little bit more disciplinary and  
22 aligned with the actual committee-subcommittee  
23 structure that we have in the ACRS. And I'm  
24 struggling with this, but I'm hoping Weidong will help  
25 me. I think we need to see what - at least in the

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1 area that I'm interested in - how to look at what has  
2 happened and abstract from that the issues, and then  
3 perhaps organize ourselves so that we can deal with  
4 these in one meeting or two meetings or whatever, on  
5 certain days, and then make sure the right people are  
6 here to deal with them. And that we go into  
7 sufficient depth.

8 Because that is an internal organizational  
9 matter, but I think with the help of our own staff as  
10 well as the staff we have on the NRC side, any help  
11 that Westinghouse can give us, we should try to arrive  
12 at this thing rapidly. Time is moving on, and we are  
13 being torn between four concepts that are all asking  
14 us to spend time on their - now if you look at Mike  
15 Corradini, he is happy with what is done, exactly what  
16 you are saying. Now maybe he is dealing with the new  
17 concept, so he can do it. But - or at least one that  
18 we are certifying - but he's moved in that direction.

19 So he's saying, you come to this meeting, you come to  
20 this meeting, you bring these people, make sure you  
21 look into this in detail.

22 CHAIR RAY: I think we are both text-  
23 driven, chapters and sub-chapters, sections, and we  
24 are also driven in a order which is simply the  
25 sequence with which those particular chapters emerged

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1 from the staff. It becomes next to impossible. So I  
2 think we need a different platform to do what you say,  
3 which is the logical thing that we should try and do.

4 MEMBER BANERJEE: But that is the thing,  
5 when you are dealing with say fluid dynamic issues  
6 they are cross-cutting. They are going to arise with  
7 the piping, they are going to arise with your blind  
8 ends, they are going to arise with your LOCA analysis,  
9 they are going to arise - but to get the right people  
10 who know how to do CFD or whatever it is, at this  
11 meeting, which is within the expertise of the ACRS  
12 certainly, we need to aggregate them.

13 CHAIR RAY: No, I do understand that.  
14 Again, all I'm observing is, we need a different  
15 platform.

16 MEMBER BANERJEE: It's the same with all  
17 the other reactors, and they are able to do it.

18 CHAIR RAY: Nobody has yet done what we  
19 are attempting to do here. That is the difference.  
20 The problem here is, we are not doing the whole  
21 chapter; we are doing a bunch of little pieces.  
22 Because they change - instead of the whole thing. So  
23 we don't have as much meat within it. We are trying  
24 to compensate by throwing three chapters together  
25 instead of one, and it isn't quite as smooth for

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1 Corradini as it sounded. Until you turn around quit a  
2 good deal.

3 Any other comment? Because we will be  
4 coming back to this later. Sam?

5 MEMBER ARMIJO: Yes, I endorse your  
6 recommendation to - for us to add value we need to  
7 work on functional things rather than regulatory  
8 language and things like that. For example, and if we  
9 could go chapter by chapter in the areas of more core  
10 changes, or thermal hydraulics, focus on our  
11 disciplines, that I think would help a lot.

12 To me I'm still not quite sure why the  
13 vessel diameters increased by two inches. To me  
14 that's a big deal; I still don't understand why one  
15 would do it. But we were told today that it's just to  
16 give it - put more water between the core.

17 MEMBER SHACK: Bigger is better, Sam.

18 MEMBER ARMIJO: Well, maybe so. Is the  
19 core diameter bigger? I don't know, and I probably  
20 should know.

21 MEMBER SHACK: The BWR guy knows that  
22 water is what you want.

23 MEMBER ARMIJO: I love water; no problem  
24 there. I just don't know why that vessel diameter is  
25 so much bigger than the original certified design

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1 unless the power is being upgraded, or some other good  
2 reason.

3 But basically that would help a lot,  
4 because I never know when to come to this meeting when  
5 I can do some good unless - we talk a lot to try to  
6 get the right people here.

7 On the open items, I think what we covered  
8 today clarified a lot of things for me, particularly  
9 the materials change, on the main steam line, was very  
10 clear.

11 As far as follow up, I really would like  
12 to learn more about the resolution of that J-groove  
13 weld issue, whether that ultimately is solved by an  
14 analysis or actually requires a design change. I  
15 would be stunned if it would require a design change  
16 after all the years we have been putting J-groove  
17 welds into PWRs. Anyway I'd sure like to make sure  
18 that doesn't just get - that we take a look at it  
19 again when the staff is ready. And with that --

20 CHAIR RAY: Okay, well, that reminds me  
21 of something I've said to others, talked to Sanjoy  
22 today, and also, I do believe that the progress we are  
23 engaged in here, the only way we can really cope with  
24 it is to view it as screening a whole lot of stuff,  
25 and listing things that have to be revisited.

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1           Now if we can come up with a different  
2 process, and God knows I've invited anybody to tell me  
3 how to do that who's got an idea, fine. But right now  
4 we are going to have to -- and as part of this wrap  
5 up I want to ask each of you - Sanjoy has already said  
6 he would - provide us input about - more than what you  
7 were able to do right at the moment, which Mike has  
8 taken down. But give us something that perhaps would  
9 provide better direction to the staff as something  
10 that we would need to revisit at a future meeting, and  
11 we will simply have to schedule it and do it.

12           Now that is going to be difficult for  
13 others, but we've - there is just no way around it  
14 that I can see.

15           So do indicate to me or to my - this is  
16 something that needs to be further discussed in  
17 subcommittee before we get to the full committee;  
18 otherwise the full committee will just disintegrate if  
19 we don't do that.

20           We are meeting on the 19<sup>th</sup> and 20<sup>th</sup>, right?

21           MEMBER BANERJEE:       There is a conflict  
22 with ESBWR, which is 20<sup>th</sup> and 21<sup>st</sup>.

23           CHAIR RAY:       And there is an EPR meeting  
24 that is scheduled, that was on the 18<sup>th</sup> and is now  
25 moved to the 19<sup>th</sup>. But scheduling is like tomorrow's

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1 task, and we don't have to fight over that subject. I  
2 know there conflicts, but I just have to do what I  
3 have to do.

4 MEMBER BLEY: Actually the last version of  
5 the schedule I saw, the conflict between ESBWR and  
6 AP1000 disappeared. That's 17 /18 for ESBWR and 19 -  
7 (Simultaneous speakers.)

8 CHAIR RAY: I just want to make the point  
9 that there is an agenda to be set for the 19<sup>th</sup> and 20<sup>th</sup>  
10 that isn't set yet, and the way we've set them for the  
11 first two pairs of meetings is, we can't do much more  
12 than decide what we need to come back and look at  
13 later. And maybe we can do a better job, like Sanjoy  
14 is suggesting, on the meetings on the 19<sup>th</sup> and 20<sup>th</sup>.

15 Okay, Dennis.

16 MEMBER BLEY: I was just surprised by  
17 those dates. I didn't see them --

18 CHAIR RAY: Well, they have been on  
19 Sherry's list for some time. They've been on my  
20 calendar since July.

21 MEMBER BLEY: She sent out a new one this  
22 week.

23 CHAIR RAY: They have been on there since  
24 August 31<sup>st</sup>.

25 MR. LEE: The AP1000 dates have been set

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1 for a couple of months. Because we were asked to get  
2 in the queue as quickly as we could by the staff. And  
3 NRO - as Harold said, later - but NRO has already told  
4 us what our priorities are, or has suggested what our  
5 priorities should be.

6 CHAIR RAY: We are having trouble with  
7 that process as you heard. So we will deal with that  
8 later.

9 Dennis?

10 MEMBER BLEY: Just a couple of things. I  
11 hit on these yesterday. But as to your last point,  
12 things that we either need to revisit or need, we need  
13 to identify and obtain the WCAPS, topical, technical  
14 reports, whatever they are called. The ones I've  
15 flagged are the ones for Chapter 18 and Chapter 7, and  
16 we talked yesterday about seeing some detail on the  
17 open things about the PRA or PRA guys weren't here for  
18 the first meeting, so we do have a couple of issues  
19 there.

20 CHAIR RAY: Yes, that's exactly right. I  
21 want to underscore that the PRA got not even a good  
22 screening review in the July meeting.

23 MEMBER BLEY: But there are a number of  
24 things there that we need to ask about. I can drop  
25 you a note about what the key issues are.

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1 CHAIR RAY: Yes, would you?

2 MEMBER BLEY: And maybe if a few of us  
3 just got together and brainstormed on a board we could  
4 figure out a way to reorganize a little bit how these  
5 meetings come.

6 CHAIR RAY: It'd be easy to do.

7 MEMBER BLEY: It might not work for  
8 staff.

9 CHAIR RAY: That's the problem. We are  
10 driven by the staff right now.

11 MEMBER BLEY: But if we are not getting  
12 to things because of the way it's organized, it's  
13 going to slow them down in the long run.

14 CHAIR RAY: I think so.

15 MEMBER BANERJEE: You know we are going  
16 to continue until we are satisfied. So ultimately we  
17 will just keep revisiting stuff until we --

18 CHAIR RAY: Nobody has been more  
19 outspoken than I have.

20 MEMBER BONACA: It's a general issue for  
21 everybody who is doing these reviews. And that's why  
22 we talk about this being critical to organize for the  
23 next meeting to discuss this very issue, how do we do  
24 it, or should we improve?

25 I must say that when I look at this

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1 presentation here this morning, I am not suggesting  
2 that -- this provided a lot of help as a guide to  
3 what we are reviewing. If I had this together with  
4 the material that was given to us before, it would  
5 have been very helpful. So there is a little example  
6 of how - I'm not saying in a formal overhead, but  
7 certainly a few bullets, a few words, it provides a  
8 guide that helps us.

9           What's the value added by the ACRS to  
10 perform the review? Are we doing just what the staff  
11 has already done, and they find whether that is  
12 correct? If that is the case I don't think they add  
13 another value, because they have been spending  
14 hundreds of hours, and we spend a few tens of hours,  
15 so again when we do this, discuss these issues, what  
16 is the best use of our time.

17           In general regarding what I saw today and  
18 yesterday, and I apologize for the time I was out  
19 because I had a meeting with Yatsco and other people,  
20 I feel that the presentations were clear, information  
21 was good, and I think the SER was on target. I think  
22 that - it seems to me that the staff is raising the  
23 right issues in the SERs. That is a feeling. Right  
24 now it's more than - I don't have a sense of  
25 completeness or whatever. It's simply that the

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1 questions that have been raised were appropriate, and  
2 that's pretty much that.

3 CHAIR RAY: Okay, Mike.

4 MEMBER RYAN: Thanks. I second all the  
5 comments that have come before me, but I would add a  
6 little bit of time, maybe it's 40 minutes or 45  
7 minutes at the end of a day, or maybe each half day,  
8 and really go through the list of commitments that  
9 have been created there in that session. Who is going  
10 to input somebody something? A is going to give this  
11 to B, and just write out all our plans so that when we  
12 walk around after two full days we've got a list of  
13 things we know are going to be transmitted from one  
14 party to the next, whether that's the applicant or the  
15 staff or the ACRS or the NRO. Or NRO is going to  
16 provide something to the committee. So that we are  
17 real clear what commitments or what information has  
18 been made, so we can all feel like we didn't miss  
19 anything, and we don't have to doublecheck our list  
20 and make extra phone calls to make sure we touch all  
21 the bases, or ask for it again, or whatever it might  
22 be.

23 So I just offer that there ought to be a  
24 formal half hour or so, maybe once in the morning,  
25 once in the afternoon, maybe it doesn't need to be

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1 that - maybe we'll get good at it.

2 CHAIR RAY: I think some of the session  
3 ought to be kind of described, and maybe it's Mike or  
4 somebody helping Mike, to track all those as we go  
5 through the day.

6 MEMBER RYAN: Probably what would help  
7 to do that is to make more specific the identification  
8 of a future action item at any time. So rather than,  
9 did you get that note or write that down, you just  
10 stop and say, well, that should become an action item.

11 The next one is number six, and --

12 CHAIR RAY: That is exactly what I'm  
13 saying.

14 MEMBER RYAN: -- you know what it is.  
15 Because after two days or even one day, it's hard to  
16 remember, and everybody has got other things they want  
17 to do. And if we had created something as we went  
18 along, we could just validate it.

19 And I'll be happy to volunteer to help you  
20 do that.

21 CHAIR RAY: Well, you volunteer for a lot  
22 of things. I think it's a good point.

23 MEMBER RYAN: Somehow we ought to make  
24 sure we don't leave the room thinking one thing, and  
25 then having something that doesn't line up.

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1 CHAIR RAY: Tom.

2 CONSULTANT KRESS: I think I agree with  
3 Bill Shack that the RTNSS seems to be the issue. In  
4 my view, the safety status of any design plan has two  
5 points. One is how well does it meet the Design Basis  
6 Accidents and defense in depth. And how well does it  
7 meet its risk goals.

8 Now if you have a component that is -  
9 meets all the Design Basis Accident requirements, and  
10 still is risk-significant, that ought to be a risk-  
11 significant component, and ought to have RTNSS  
12 applied to it. Just as if it were a safety  
13 component.

14 So I think - I kind of agree with the  
15 staff, there may be a need for more requirements for  
16 some of this risk-significant systems.

17 CHAIR RAY: Let me interrupt you for a  
18 second and ask, do you think we are at a point where  
19 we could draw some conclusions from our experience  
20 that would be generic?

21 CONSULTANT KRESS: I don't think so,  
22 because this design was just too different. When I'm  
23 talking about risk significance, I'm talking about -  
24 the CDF is so low for this plant it's hard for me to  
25 come up with anything that would be very risk

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1 significant. But there might be some things that  
2 would impact the LRF of say ten to the minus six per  
3 year. If it impacted that significantly, I would  
4 think it would be risk significant.

5 Anyway I think that is still an issue and  
6 ought to be looked at.

7 With respect to GSI-191, I think the issue  
8 is going to come down to the downstream effects, and I  
9 think the resolution of whether or not we meet some  
10 sort of downstream effects criteria will have to wait  
11 for the COL. I'm not sure you can do it at the  
12 design stage. Because in my mind it'll involve what  
13 might be an acceptable level of fibrous debris, and  
14 that is going to be caught mostly - and I don't know  
15 how you do that in the design stage.

16 And anyway, and that will probably have to  
17 wait until the middle of next year until the overall  
18 GSI-191 has been resolved.

19 MEMBER BANERJEE: It may not be resolved  
20 on that timescale either. But Tom what do you think,  
21 it can be that this plant will have very different  
22 debris than - obviously they would try not to have the  
23 issues that we've had with the other plants. And it  
24 might be possible to deal with it in a special way as  
25 to downstream effects. I have to look at the whole

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1 thing and see if there is a way out. If there is a  
2 way out what is it? It would be nice.

3 CONSULTANT KRESS: I think clearly the  
4 downstream effects, if you have got reflected  
5 insulation, I don't think they get into downstream  
6 effects. So it has to be fibrous debris, and it has  
7 to be issues of -- I think you can deal with it in  
8 particular for this - I think you have a good  
9 suggestion there, and it might be - I think it's well  
10 worth pursuing.

11 MEMBER BANERJEE: The devil is in the  
12 details.

13 MR. CUMMINS: At some point when you are  
14 done maybe I could make a point.

15 CHAIR RAY: When we are done.

16 CONSULTANT KRESS: I think the ACRS needs  
17 to - we have a pretty good review of the WESTEMS. It  
18 seemed to me there were substantial open items, very  
19 substantial. And I think you need to get involved in  
20 the review of it, WESTEMS, and this would be  
21 particularly thermal hydraulics people and structural  
22 mechanics people I think.

23 I didn't think we got a real satisfactory  
24 - at least I didn't - resolution of the striping  
25 issues. I think we need to review the scaling

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1 criteria to see how it was applied and whether or not  
2 we think something might be missed there, and how to  
3 determine whether we missed something when you get to  
4 the actual COL stage.

5 Another item, I was surprised at the hard  
6 rock spectrum. I was expecting that to have some  
7 influence on particularly some electronic components  
8 and electric components. And I'm surprised we haven't  
9 seen some -- when the high frequency has more impact  
10 on those things than the low frequencies do, because  
11 it depends on mass, and how they are logged in. So  
12 I'm not sure the item is resolved yet. I think you  
13 need to look at it again and see if there is not some  
14 vulnerable small electronic components, electric  
15 components, to the hard rock spectrum.

16 Finally just some minor typographical  
17 errors I thought I'd bring to your attention. You  
18 might want to change them in the DCD. One of my  
19 interests is in accelerated aging, so I looked at  
20 Appendix D to see what was going on there. And on  
21 pages 3D.99 and 100 there is two equations, it's an  
22 input to this aging equation. And 3D.99, it's the  
23 second equation under the word, therefore. What you  
24 have is a plus sign actually with 25 degrees. It  
25 should be an equal sign. And the same typographical

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1 error occurs on the next page on the same equation.  
2 The plus sign, actually 25, should be an equal.  
3 That's just a minor change, but since you're in the  
4 DCD, you might want to correct it. I don't know if  
5 you have found it or not.

6 MR. SISK: Thank you. We'll check the  
7 matrix. We are trying to correct those types of  
8 things. Thank you.

9 CONSULTANT KRESS: It's a minor thing.  
10 It doesn't impact anything, because it did arise.  
11 That's all.

12 CHAIR RAY: All right, Tom, as always,  
13 thank you very much.

14 Ed, keep it short.

15 MR. CUMMINS: Yes, two comments. The  
16 hard rock spectrum, for electronic - for the hard rock  
17 spectrum for electronic components are deemed to be,  
18 or screened to be sensitive to high frequency, they  
19 are actually tested to the hard rock. So I hope that  
20 we can convince you that where you have a concern we  
21 actually do testing.

22 With GSI-191 the downstream effects will  
23 be even more important than you think, because AP1000  
24 kind of uniquely floods up, in many instances, above  
25 the break, and the water flows in the break at some

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1 point in the transients, and never goes through  
2 screens. So we have un-screened, and so we will talk  
3 about that next meeting, but it's even more important  
4 than maybe you would have perceived.

5 And the staff obviously knows this, and we  
6 are working on this, and so the second comment is, the  
7 cleanliness program is a program done by the COL  
8 Applicants, and you have to have some consistency if  
9 all your fiber comes from dirt, and you have to have  
10 some consistency between what we commit and what they  
11 commit. And the staff and we have recognized that,  
12 and while I think that we are in - we have some  
13 tension in the COL Applicants would like higher  
14 limits, but I think we are going to present limits  
15 that they will accept in their cleanliness program,  
16 and say that those are acceptable to us.

17 And then we are going to work on ways we  
18 can analyze perhaps fiber is usually our problem,  
19 higher fiber in the future. We plan on doing better  
20 testing, or different testing; we are looking at those  
21 kinds of things.

22 And I would say - there was a little  
23 discussion this afternoon about we can't resolve this  
24 until we resolve GSI-191. And I don't pretend to be  
25 an expert on GSI-191, but I would say that we have

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1 probably done more testing than they have on GSI-191,  
2 probably because we have this particular issue with  
3 downstream effects.

4 More obviously, it needed to be addressed  
5 by us as a safety issue.

6 CHAIR RAY: Okay, well taken. Anybody  
7 else have anything? Do we have any members of the  
8 public that seek to speak?

9 All right, then, with that we stand  
10 adjourned as a subcommittee until next month.

11 (Whereupon at 3:47 p.m. the proceeding in  
12 the above-entitled matter was adjourned)

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