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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

ABWR SUBCOMMITTEE

+ + + + +

OPEN SESSION

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FRIDAY, NOVEMBER 22, 2013

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ROCKVILLE, MARYLAND

The Subcommittee met at the Nuclear
Regulatory Commission, Two White Flint North, Room T2B1,
11545 Rockville Pike, at 8:30 a.m., Michael Corradini,
Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL L. CORRADINI, Chairman

J. SAM ARMIJO, Member

RONALD G. BALLINGER, Member

CHARLES H. BROWN, JR., Member

PETER RICCARDELLA, Member

STEPHEN P. SCHULTZ, Member

JOHN W. STETKAR, Member

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ACRS CONSULTANT:

BILL HINZE (via teleconference)

DESIGNATED FEDERAL OFFICIAL:

MAITRI BANERJEE

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

(8:30 a.m.)

CHAIRMAN CORRADINI: Okay. The meeting will come to order.

This is a meeting of the Advanced Boiling Water Reactor or the ABWR Subcommittee.

My name is Mike Corradini, Chair of the Committee -- of the Subcommittee, excuse me.

Members in attendance, at least currently, are Sam Armijo, Pete Riccardella, Steve Schultz, Ron Ballinger, Charlie Brown, John Stetkar, and our consultant, Bill Hinze, will join us after lunch over the telephone.

We also have Ms. Maitri Banerjee as our Designated Federal Official for the meeting.

As announced in the Federal Register, on November 7, 2013, the subject of today's briefing is Chapter 3, excluding Sections 3.7 and 3.8, which we have looked at previously in our July 9th meeting. And this regards the COL application submitted by Nuclear Innovations of North America, or NINA, for the South Texas Project's Units 3 and 4, as well as the staff's final safety evaluation report.

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1 The rules for participation in today's
2 meeting were announced in the Federal Register Notice of
3 November 7th for an open or closed meeting. As noticed
4 on the -- as you will see on the agenda, the meeting will
5 go into closed session after the initial public opening
6 statements by NINA and NRC staff, and then we will go into
7 a briefing of Section 3.9.2, Dynamic Testing and
8 Analysis.

9 I am asking at the appropriate time that the
10 NRC staff and the applicant verify that only people with
11 the required clearance and the need to know are present
12 when we enter the closed session of the discussion.

13 We have a telephone bridge line for the
14 public and stakeholders to hear the deliberations. This
15 line will not carry any signal from this end, if we need
16 to enter into the closed -- when we need to enter into
17 the closed session of the meeting.

18 Also, to minimize disturbances, the line
19 will be put in a listen-in-only mode until the end of the
20 meeting, where we will provide time for public comments.
21 We have allotted 10 minutes for that time period, so we
22 will stay strictly to that.

23 At that time, any member of the public
24 attending the meeting in person or through the bridge
25 line can make a statement and provide comments as

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1 desired. We will check on those that want to make those
2 comments as we get close to that time. And we also have
3 a separate telephone line for our consultant, Dr. Hinze,
4 to connect with us.

5 As the meeting is transcribed, I request
6 that the participants in this meeting use microphones
7 located throughout the room, which are highly sensitive,
8 when addressing the Subcommittee. Participants should
9 first identify themselves and speak with sufficient
10 clarity and volume so they can be readily heard.

11 And please silence all cell phones, pagers,
12 iPhones, iPads, i-things, and all appropriate
13 appliances -- washers, dryers, et cetera.

14 We will now proceed with the meeting. I
15 will call on Tom Tai of NRC to begin the presentation,
16 and then after Tom I wanted just to remind the members
17 of kind of where we sit relative to the review.

18 Tom.

19 MR. TAI: Thank you. Good morning. My
20 name is Tom Tai. I am the Project Manager for Chapter
21 3. George Wunder was the lead PM, but he is not here
22 today.

23 I want to thank the Subcommittee and NINA
24 for allowing us to make this presentation on the Friday
25 before Thanksgiving, so that's special.

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1 And so we have a lot of material to cover,
2 and a lot of people who have worked hard -- and I thank
3 them for it -- who know what to do. I will turn it over
4 to the STP.

5 CHAIRMAN CORRADINI: Okay. And before we
6 take it over to STP, I want to remind at least the parts
7 of -- the Subcommittee and other members that are in
8 attendance, so this has been going on for a number of
9 years, and I am new as Chairman, so I am trying to catch
10 up.

11 So people will remember we have had two
12 Subcommittees -- April on Chapter 2, July on Sections 3.7
13 and 3.8 of Chapter 3, and now we are covering other parts
14 of Chapter 3. Prior to that, in 2010 primarily, we had
15 a number of meetings on other parts of what I guess we'll
16 call Phase 4 of the COL.

17 So when we come to the -- and we're coming
18 close to the end game. I have talked with folks, so that
19 I've got it right. We still have Fukushima-related
20 issues and spent fuel issues that have to be addressed.
21 All of that hopefully will come to fruition before
22 September of '14. So we are actually in the end game.

23 I have asked Maitri to help me try to draft
24 not a letter but we'll call it a summary document, since
25 it has been going over five years of this. Not that I

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1 would expect the members have this totally perfectly in
2 their minds, but at least where we sit, so everybody
3 understands what is closed and what the remaining things
4 are open. I just wanted to remind the members of that.

5 So, Scott, it's all yours.

6 MR. HEAD: Okay. Thank you very much for
7 this opportunity to brief the Subcommittee.

8 Today we do want to brief the Subcommittee
9 on flow-induced vibration, and we are looking forward to
10 discussion.

11 So the agenda for today, we will have an
12 introduction and we'll go over the attendees, and then
13 Section 3.9.2, which is the focus of the day. We'll have
14 a program overview, and obviously a technical
15 evaluation.

16 The focus of the day is the dryer, steam
17 dryer, and so that is the, you know, major amount of time
18 that we have allotted to the discussion today.

19 We do have a presentation on line dryer
20 components, and we are going to focus there on an
21 interesting aspect of the ABWR, which is the reactor
22 internal pumps, which is different than -- obviously than
23 other domestic BWRs. And so that will be the focus of
24 that discussion.

25 We do have -- as you'll see in a second, we

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1 do have a large contingent here today of people that can
2 answer other questions. And so even though that's the
3 focus of the presentation, we do hope to be able to answer
4 any other questions that come up regarding other
5 components.

6 And then we will cover the vibration
7 measurement program and inspection program that we are
8 expecting to do with respect to Units 3 and 4.

9 And the slide with the attendees -- like I
10 say, we do have a rather robust group of people here today
11 to help us go through this and answer any questions.

12 This first part of the --

13 CHAIRMAN CORRADINI: I was going to say,
14 you'll alert me when we want to do the check about being
15 closed.

16 MR. HEAD: Yes, sir. I was going to say,
17 my portion of it is not proprietary, unless we start
18 getting questions, which, you know, we are hoping most
19 of the questions we will be able to field later on in
20 discussion. But we can -- you know, we can leave it open
21 right now, and I'll just say we have already -- everyone
22 that I know that is here is supposed to be here. So when
23 it's time to close the meeting --

24 MEMBER ARMIJO: Well, I just noticed that
25 starting with page 2 of your presentation it says

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1 "Westinghouse Proprietary," so I don't know -- and every
2 chart thereafter. So I don't know if we could be
3 semi-closed or chart by chart or what.

4 MR. HEAD: We could close it now.

5 MEMBER ARMIJO: Close it now is what I would
6 recommend.

7 MR. HEAD: Okay.

8 MEMBER ARMIJO: Yeah. Unless the Chairman
9 disagrees.

10 CHAIRMAN CORRADINI: I wanted to ask Scott
11 to make sure. So at this point, why don't we just go into
12 closed session, so -- because we are going to go into and
13 out of these issues, and I'd rather just do it now.

14 So can we do a doublecheck? Can you check
15 your people? And, Maitri I'll let you --

16 MS. BANERJEE: Yeah. I just talked to
17 Theron. He is going to close the phone line.

18 CHAIRMAN CORRADINI: Okay. Do we get a
19 heads-up, or do we just assume it has happened?

20 MS. BANERJEE: I can go --

21 CHAIRMAN CORRADINI: Why don't you do that.

22 MS. BANERJEE: -- confirm.

23 CHAIRMAN CORRADINI: Please.

24 (Whereupon, the proceedings in the foregoing matter went
25 into Closed Session at 8:38 a.m. and returned to Open

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1 Session at 11:31 a.m.)

2 CHAIRMAN CORRADINI: Okay. We will come
3 back in session. Now we're in open session, and we're
4 going to be speaking about -- well, I'll just say the rest
5 of Chapter 3.

6 Tom, do you want to take us through that?

7 MR. TAI: That is correct. Back in 2010,
8 we brought Chapter 3 to ACRS as a Phase 2 product without
9 3.7, and 3.8, and 3.9.2.

10 So we finished 3.7 and 3.8 back in July and
11 finished 3.9.2 this morning. And the rest of the
12 presentation really is just a recap of what we did since
13 the --

14 CHAIRMAN CORRADINI: We need the reminder.

15 MR. TAI: The next two slides are basically
16 stuff that we have as a confirmatory item and open items
17 since 2010. And I am not going to go into that in detail,
18 but I'd like to focus on the next one, which is -- these
19 are the four open items that we had when we left in 2010.

20 The first one is on 3.4.2, and that one
21 was -- we were asking STP to explain how they treat the
22 Cat 1 building flood doors. And we didn't resolve it,
23 but the resolution is they used a 40-foot design basis
24 flood level, which is resulting from the MCR breach. So
25 we resolved that one.

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1 The next one, again, is --

2 CHAIRMAN CORRADINI: Just to say it again,
3 so it was resolved how? I'm sorry.

4 MR. TAI: Originally, they used something
5 like 30 feet was the flood level, to design a flood door,
6 and to -- we didn't like that answer, so -- because the
7 MCR breach is 40 feet.

8 MEMBER ARMIJO: That's the dike or whatever
9 that pool, pond --

10 MR. TAI: That's right. The main cooling
11 reservoir. So we were happy with that.

12 And the next two are in 3.9.3. The first
13 one is we have to -- we want to review the design spec,
14 which wasn't available at the time. So the caution was,
15 what are the safety-significant components that you want
16 the design spec for us to review? And that is part of
17 the January 2011 audit, and we got that one.

18 And 3.9.3.7 is -- actually, we presented it
19 to you some time ago on Generic Issue 191. That is the
20 loading on the strainer. So we have -- so we resolved
21 that.

22 And the last open item is on 3.9.6. That
23 was the use of the OM code for in-service inspection,
24 in-service test.

25 And the other changes that we have made

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1 since 2010, most of the chapter stays identical, with the
2 exception of what we listed in here. 3.2.1 and 3.2.2
3 were interesting because these two sections were
4 basically qualifications -- all qual classification and
5 seismic classification. These two sections were
6 finished way before 3.7 and 3.8 even get started.

7 So we made a lot of -- we asked a lot of
8 questions, and Rich Mannally was the reviewer. He has
9 to ask questions because he had nothing to look at in 3.7
10 and 3.8. But those questions are really moot now that
11 3.7 and 3.8 are done. So we have to rewrite them just
12 to get rid of some of the extra material, so to speak.

13 And 3.3.1, 3.3.2, 3.5.1.4, were revised
14 because Reg Guide 1.221, which is hurricane wind, was
15 issued in 2011. And, again, we just need to update these
16 sections by adding a departure. There is not a whole lot
17 of text change.

18 3.5.1.3 is interesting, because we had a
19 discussion with ACRS at the time about the turbine
20 maintenance program. There was no action, so to speak,
21 but the discussion was, what did you guys do to allow STP
22 to provide -- to submit the maintenance program three
23 years after COL?

24 We looked at it in more detail and we decided
25 that, well, nothing has really changed. So what we did

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1 is we imposed a license condition to ask them to do
2 turbine inspection. If they want to submit that turbine
3 maintenance program three years after COL, they can do
4 license amendment and flip that.

5 So the review is identical. It is just that
6 we made it a little bit more airtight by imposing the SRP
7 guidance.

8 3.9.1, you heard in the 3.9.2 discussion
9 they used the computer acoustic tool to do common pulse
10 load, and we just need to revise and add to it.
11 Originally, it was an IBR section.

12 3.9.4, originally, again, that was
13 basically an IBR section. But because in the audit of
14 the design spec we find something in the spec, we did
15 revise it.

16 MEMBER STETKAR: Tom, before you -- go
17 back. I wanted to let you get through all of the bullet
18 items there.

19 On the turbine missile stuff, you know, we
20 had discussions and everyone is aware that the turbine
21 missile analysis, the failure to trip frequency, once
22 they get around to submitting it and you get around to
23 reviewing it, I'd just, again, like to get on the record,
24 make sure it's complete that it's an end-to-end analysis
25 that includes everything from the speed sensors all the

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1 way through to valves.

2 There is nothing that we can -- we are not
3 going to see that, but I sure hope the staff and the
4 applicant takes it to heart, because everything that I
5 have seen is not a complete end-to-end analysis. But,
6 again, it has not been officially submitted. So that's
7 just speculation.

8 However, something I wanted to ask you as
9 the staff, if now imposed a license condition that
10 requires weekly testing of the turbine stop valves,
11 control valves, intercept -- whatever they call them,
12 intermediate stop valves, intercept valves, and
13 extraction steam non-return valves, have you evaluated
14 the increase in risk that you were imposing on this plant
15 by requiring that testing?

16 MR. TAI: I'm not sure it's a week-to-week
17 inspection. I thought the inspection was --

18 MEMBER STETKAR: I'm sorry. It says
19 "weekly valve testing." It says "weekly valve testing."
20 Once a week, I have to cycle those valves. Have you
21 evaluated the increase in risk that the staff is imposing
22 on the South Texas plant by requiring that testing?

23 MR. TAI: Okay. Well, I'm not too sure
24 we --

25 MEMBER STETKAR: Because there is a

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1 measurable increase in the plant trip frequency as a
2 result of turbine valve testing. So, therefore, before
3 I imposed a weekly test interval, I would go back and look
4 at how frequently you would expect the plant to trip and
5 what the increase in risk will be, and whether that is
6 warranted for weekly versus monthly versus, you know,
7 some other frequency.

8 MR. TAI: I'll take that as an action, to
9 make sure the --

10 MEMBER STETKAR: Thanks. Because weekly
11 valve testing is pretty often.

12 MEMBER BALLINGER: I would be curious to
13 know if that's common.

14 MEMBER STETKAR: Weekly is not -- people
15 don't like to test these valves that frequently because
16 it trips the plant. And people use these turbine missile
17 analyses to tune -- you know, to tune the testing
18 frequency. But the staff is just imposing a weekly test
19 frequency and saying that that is --

20 MEMBER BALLINGER: I came into this very
21 late, so I'm part of the unwashed here, so I'm just
22 curious to know why in this case a weekly test
23 versus -- because I've visited the plant before, and I
24 can guarantee you that --

25 MEMBER STETKAR: The key is that the --

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1 MEMBER BALLINGER: -- you put these things
2 up, you run them, you don't mess around with the valves.

3 MEMBER STETKAR: The key is the turbine
4 missile analysis determines the test frequency based on
5 the expected reliability of the valves, the electronics,
6 the pickup stuff, the intermediate hydraulic fluid, and
7 all of that kind of stuff. So in some sense it is
8 plant-specific because it depends on the inventory of
9 equipment that you have and its logical configuration,
10 and might have been to get certain types of things.

11 So it's not one size fits all.

12 MEMBER BALLINGER: It's driven by some
13 other thing.

14 MEMBER STETKAR: No. It's driven by
15 reliability of --

16 MEMBER BALLINGER: Reliability of --

17 MEMBER STETKAR: -- of the whole thing. Of
18 the whole thing. Not just the end user valves. It's the
19 whole thing. And then you set up -- you kind of optimize
20 your test frequency so that you test often enough to
21 maintain the overall reliability, but not --

22 MEMBER BALLINGER: I understand all of
23 that, but I'm curious why for this plant and not others.
24 Weekly is pretty short.

25 MEMBER STETKAR: That's right. Other

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1 plants tune their testing intervals based on a turbine
2 missile analysis. And NINA has not performed that
3 analysis yet, and does not plan to submit that analysis
4 until three years after the COL is issued. So now the
5 staff is saying, well, you need to do -- you need to give
6 us some assurance of valve testing.

7 I understand the need to have some sort of
8 valve -- nominal valve testing interval that applies
9 until that turbine missile analysis is submitted and
10 reviewed by the staff. The question is just nominally
11 imposing a weekly testing interval has -- may have some
12 negative risk connotation to it, and there is --

13 MEMBER BALLINGER: It's an artificial
14 imposition.

15 MEMBER STETKAR: This is the staff's
16 imposition. And it's stated as a weekly testing
17 interval. I mean, it could be a monthly testing
18 interval. It could have been a 10-year testing
19 interval.

20 MEMBER RICCARDELLA: But that is only in
21 place until the turbine missile analysis is completed.

22 MEMBER STETKAR: That's right. However,
23 this is the safety evaluation that has to be issued for
24 NINA to receive the combined license. And NINA has made
25 it clear that they will not submit the turbine missile

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1 analysis until three years after the license is issued.
2 So there is this timing problem. The staff actually is
3 in a bind because there has to be some specified testing
4 frequency.

5 MS. BANERJEE: But I was wondering -- this
6 is Maitri Banerjee -- how much of that three years is
7 spent in construction and --

8 MEMBER STETKAR: It doesn't make any
9 difference. There is --

10 MS. BANERJEE: They are not going to be
11 operating --

12 MEMBER ARMIJO: There has got to be a better
13 administrative thing than imposing that kind of --

14 (Laughter.)

15 -- for the license, that kind of license
16 condition.

17 MEMBER STETKAR: It doesn't make any
18 difference. The staff has to issue a safety evaluation
19 to issue the COL, and there has to be some justification
20 for assurance that indeed the turbine missile damage
21 frequency is less than an acceptable value. I
22 understand the problem that the staff is in.

23 MR. TAI: Basically, it said submit that
24 thing and they --

25 MEMBER STETKAR: I understand the bind that

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1 the staff is in. I'm just questioning the basis for that
2 weekly testing frequency.

3 CHAIRMAN CORRADINI: Do you understand his
4 question?

5 MR. TAI: Yes, sir.

6 CHAIRMAN CORRADINI: Okay.

7 MEMBER ARMIJO: I don't understand. You
8 put all sorts of requirements before you allow them to
9 load fuel. Why couldn't this just be another
10 requirement of something that has to be submitted prior
11 to fuel loading?

12 MR. TAI: Well, because that's what we -- we
13 run into this. The IBR -- the DCD -- legally, they have
14 that right, and the DCD did submit the analysis three
15 years after COL. So --

16 CHAIRMAN CORRADINI: But I don't
17 understand that answer to Sam's question. You could
18 change the license condition to what is being -- and that
19 is much cleaner, unless I misunderstand something.

20 MR. TAI: Well, we could. We could change
21 it. We could submit it to the missile program three
22 years after the COL. Sure, we could do that. But the
23 SRP basically is saying that you can do either one. So
24 we feel that, well, it is a little bit easier because that
25 three-year schedule and the program, really, it's an

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1 option.

2 So either way -- we can word it either way.

3 CHAIRMAN CORRADINI: Okay. But you
4 understand John's question.

5 MR. TAI: Yes, sir.

6 CHAIRMAN CORRADINI: Okay. The
7 justification for this value seems arbitrary, too
8 stringent maybe to --

9 MEMBER ARMIJO: It certainly gets your
10 attention. It is likely to be --

11 CHAIRMAN CORRADINI: But what worries me
12 beyond arbitrary is the implication is that it could be
13 actually more damaging.

14 MEMBER BALLINGER: But it is likely to be
15 basically a paper shuffling exercise, because they are
16 never going to operate the plant before they submit
17 the -- before they actually -- anyway, okay.

18 MR. TAI: You are exactly true, because
19 that is --

20 MEMBER STETKAR: All of that is true. On
21 the other hand, if the staff is issuing something that
22 has a very specific requirement -- and what I'm asking
23 the staff is, have they done -- have they thought about
24 that requirement from an integrated perspective,
25 integrated plant safety perspective?

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1 MEMBER SCHULTZ: It could be taken out of
2 context as a good idea.

3 (Laughter.)

4 CHAIRMAN CORRADINI: Okay. John, did
5 you --

6 MEMBER STETKAR: I have nothing else.
7 Good discussion, though.

8 CHAIRMAN CORRADINI: Next page.

9 MR. TAI: These are the three action items
10 that we took from the last ACRS. 3.4 is -- we finished
11 that because those are the WCAPs for the 3.9.2 program.
12 And 86 -- Dr. Abdel-Khalik was asking that question about
13 the turbine plate material. He is asking now that we
14 change -- some of these requirements should be changed
15 to SRP.

16 We talked to NRR folks, and they
17 acknowledged that they don't have any plan or schedule
18 revise the SRP right now.

19 CHAIRMAN CORRADINI: Remind us about this
20 one. I would say remind me because I'm --

21 MR. TAI: We were talking about the turbine
22 rotor at the time.

23 CHAIRMAN CORRADINI: Okay. So we're going
24 to talk about --

25 MEMBER BALLINGER: This monobloc, right?

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1 MR. TAI: Yeah. Yeah. That's right.
2 That's right. And we see here that these are different
3 now. So Dr. Abdel-Khalik's question was, now that it's
4 different, should you -- will you be revising the SRP to
5 reflect the latest technology? And obviously we can't
6 answer those questions because we are NRO. And NRR folks
7 are aware of that. And because they have no schedule
8 planned, but they said they would consider that when they
9 do it.

10 So our analysis is really -- it's an open
11 item still. But for the agency to take that up.

12 MEMBER ARMIJO: That's a generic.

13 MR. TAI: It is a generic. Yeah. It's not
14 an STP question.

15 MEMBER ARMIJO: Yeah.

16 MS. BANERJEE: Now, I'm sorry, I have a
17 question on this 107 that you are going to go into.

18 CHAIRMAN CORRADINI: I don't think he is
19 going to go into it now. We have to wait until
20 Professor --

21 MS. BANERJEE: Hinze comes --

22 CHAIRMAN CORRADINI: -- is coming. Yeah.

23 MS. BANERJEE: That's all I wanted to say.

24 MR. TAI: Okay.

25 MS. BANERJEE: Thank you.

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1 CHAIRMAN CORRADINI: So just to review,
2 we're done with 34, in essence, before we have had this
3 discussion; 86 is still an open item; and 107 we will take
4 up in the afternoon.

5 MR. TAI: Right.

6 CHAIRMAN CORRADINI: Okay.

7 MR. TAI: And that's basically what we have
8 done in Chapter 3. There is no more technical items.
9 There is still maybe one or two confirmatory
10 items -- actually, one in 3.9.6. We received Revision
11 10 of the FSAR last month. We need to negotiate with Tom
12 how we close that confirmatory item. It's editorial.
13 It's a typo probably.

14 And we add two license conditions to the
15 review. One is determined roller, and the 3.9.2, which
16 we just talked about this morning, the power ascension
17 test.

18 Are there any other questions?

19 CHAIRMAN CORRADINI: Any other questions
20 for Tom?

21 (No response.)

22 So just to review for the Subcommittee, we
23 will take up the other action items that we still have
24 on the docket from 2010-ish timeframe with NINA after
25 lunch.

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1 MR. HEAD: Yes, sir. And I would note we
2 are also going to -- we have a slide on 107, so when the --

3 CHAIRMAN CORRADINI: Right.

4 MR. HEAD: -- Dr. Hinze is on, you probably
5 can close it then, instead of Tom having to come back up.

6 CHAIRMAN CORRADINI: Yeah, that's fine.
7 We'll do that. But we have to do it after lunch because
8 that's just how we scheduled Professor Hinze to come.

9 MR. HEAD: Okay.

10 CHAIRMAN CORRADINI: Any other questions
11 for Tom at this point?

12 (No response.)

13 MR. TAI: And I have an action item to
14 follow up.

15 CHAIRMAN CORRADINI: Indeed. That one we
16 are not going to let go of.

17 MR. TAI: All right.

18 CHAIRMAN CORRADINI: All right. With
19 that, we'll take off for lunch. Be back at 1:00.

20 (Whereupon, at 11:49 a.m., the proceedings recessed for
21 lunch.)

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

(1:00 p.m.)

CHAIRMAN CORRADINI: We are back in session.

So, Scott, you're going to lead us through a discussion of action items?

MR. HEAD: Yes, sir.

CHAIRMAN CORRADINI: Okay.

MR. HEAD: We have three of them we were going to cover today, and the first one is number 87 on turbine overspeeds. And I'm going to turn it over to Steve Thomas to address that one. This should be the

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lengthier part of the discussion. The other two are relatively --

CHAIRMAN CORRADINI: I don't expect it to be very lengthy.

MR. HEAD: Good.

(Laughter.)

Certainly more interesting. How about that? More interesting.

MEMBER BALLINGER: Send Stetkar out for coffee.

(Laughter.)

MR. THOMAS: My name is Steve Thomas. I'm an engineering manager for STP 3 and 4. I have a B.S. degree in Mechanical Engineering from Georgia Tech, and I've been in the nuclear industry for 40-plus years, starting with the U.S. Navy, three utilities, and one small private company for a short period of time.

I spent the last 20 years at South Texas Project. First 14 or 15 of those was at Units 1 and 2 as the design engineering manager, and then more recently the engineering manager for our new project, STP 3 and 4.

I have been staring at this question now for the better part of a month and a half, maybe two months, and I've read the transcripts. Two other people who have

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1 attempted to address this are no longer on the project.

2 (Laughter.)

3 Scott asked me to take a shot at it.

4 It's a good question. It's a difficult
5 question. And like most difficult questions, I don't
6 have an easy black and white answer. So what I do on the
7 next slide was try to rephrase the question, perhaps into
8 one I think I might be able to answer.

9 MEMBER BROWN: Even though it's not exactly
10 the --

11 MR. THOMAS: It's not the same thing.

12 MEMBER BROWN: This sounds familiar.
13 Let's -- if you don't like that question, let's phrase
14 it into something we can answer.

15 (Laughter.)

16 CHAIRMAN CORRADINI: It sounds like
17 something that we're used to.

18 MR. THOMAS: Seriously, I have thought
19 about this a great deal. The approach I have tried to
20 take on this issue is to put myself in a position that
21 I have been in many times when we have a situation at the
22 plant that requires some judgment to deal with. And I
23 have thought, you know, how am I going to respond to this
24 issue?

25 I am going to put myself in the position,

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1 as the engineering manager at the plant, talking to the
2 plant manager or senior executive at the plant and say,
3 "How are we going to deal with this situation?" It's a
4 difficult question. And, again, I don't have a black and
5 white answer. But I think that this approach will give
6 us some insight as to -- into the issue and I hope put
7 us at a point where we are comfortable in moving forward
8 with the plan.

9 Is that okay?

10 CHAIRMAN CORRADINI: I'm going to listen.

11 MR. THOMAS: Okay. I want to repeat some
12 things. Let's go back to that one. I'm just going to
13 read this question that I restated and see if it makes
14 any sense. Since the normal emergency trip function
15 with three active speed sensors produces an alarm for
16 abnormal speed signals, and a turbine trip for two out
17 of three abnormal speed signals, and since the backup
18 primary trip function only provides alarms, no trip
19 function for abnormal speed signals, if we were in this
20 situation, and we got an alarm that says, "One of my speed
21 sensors is not working," and we decided to troubleshoot
22 and take the system out of service for some period of
23 time, why is removing the backup primary overspeed trip
24 system from service for troubleshooting -- why is that
25 acceptable? Is it acceptable? And, if so, why is it?

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1 And the reason that I have restated the
2 question is because the question -- your question asked,
3 you know, demonstrate that we have no common mode failure
4 potential in this situation and I can't do that.

5 MEMBER BROWN: Okay. Let me -- just
6 addressing your restating the question, the fundamental
7 philosophy, the basis for the question in the first
8 place, was basic philosophy, at least in my experience,
9 for operating high-speed rotating machines, big ones
10 like turbines, generators, other pieces of equipment, is
11 that your overspeed trips should be independent of the
12 normal speed control function.

13 Fundamental philosophy, philosophical
14 point.

15 When you look at your design as it presently
16 sits, you meet that for normal operation. You have a
17 primary -- you have a normal speed control function,
18 which has three active sensors. And you have -- and the
19 sensors themselves are not the issue here. Okay? They
20 are just part of the means for the problem, that's all,
21 like anything else.

22 The passive system is the primary passive
23 sensors. They are totally separate, separate power
24 supplies, separate sensors from the normal speed control
25 function. There is no problem with that mode, you know,

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1 about -- you are crunching along, everything is totally
2 independent. They are both electrical.

3 That, in itself, was one of the generating
4 things, since if you'll look at the SRP, the general
5 requirements in there, or the thing they review for, is
6 to have a mechanical and an electrical -- mechanical
7 device as well as if you want to have an
8 electrical -- you've got to have a mechanical overspeed
9 trip as one of the two items.

10 You chose not to do that. You are not the
11 only one that has chosen not to do that. So with that
12 in mind, then you made a statement in one of your all's
13 responses that says, "Gee, when we have two active speed
14 sensors" -- now we're just talking about
15 sensors -- "fail, or indicate a failure, you get a trip
16 of the turbine generator, of the main generator."

17 And I asked a question about if you have two of
18 your primary overspeed trip sensors fail, do you get a
19 trip of the main turbine? The answer was no, and that
20 was all we got in the first round of this.

21 Subsequent answers -- responses came
22 through, of which those individuals are now gone, as you
23 noted, posited some other circumstances relative to if
24 you see something going on that you shouldn't, you are
25 directed by procedure to operate quickly, by procedure

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1 to do something and refer to a table in I guess it's the
2 ITAAC. It's Table 3.5-1, which referred you
3 then -- well, no, that's not it. It was 3.XXX. I'm
4 sorry. That was the table in the -- something that was
5 in one of the documents that you all submitted, one of
6 the RAIs.

7 And that is -- your all's positions -- or
8 presentations then referred also to a Table 3.5-1, which
9 is in the DCD. It talks about probabilities of missile
10 generation, and if you have p-1, p-2, p-3, p-4, where if
11 your probability is p-1, you can operate for a couple of
12 years.

13 If your probability is less than two -- I've
14 forgotten what -- 10 to the minus two -- I'm sorry, 10
15 to the minus fourth and 10 to the minus two, then you had
16 to go through a process. You have six days in order to
17 bring the plant into a shutdown condition, which is kind
18 of reasonable. Okay? You just don't go scram the
19 plant. You put yourself in the condition -- the
20 manager -- but you do something in a timely manner.

21 So the fundamental issue here is the
22 independence of your overspeed trip function, regardless
23 of where it resides, either the primary or the emergency,
24 its independence from the normal speed control function.

25 And the second part of the issue arises

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1 from -- we are not talking about an individual sensor
2 failure or an individual processor failure. The issue
3 that drives part of that question is, if you
4 have -- because they are software-driven, if you -- and
5 your power supplies are also common, by the way, on the
6 normal system between the emergency and the normal
7 control functions, or at least based on other
8 conversations.

9 And the three active sensors, both of those,
10 that is okay depending on what they do when they get
11 inside the box called "emergency trip monitor box." You
12 provided another figure in one of your presentations
13 which was cancelled, the overall meeting was cancelled,
14 which showed the three sensors come in to the overspeed
15 trip function, and each sensor feed -- all three trip
16 monitors, all three speed monitors are fed by all three
17 sensors.

18 MEMBER STETKAR: Charlie, for the rest of
19 us who don't understand what you are talking about, pull
20 up Slide Number 7 on your presentation.

21 MEMBER BROWN: Yep, yep, yep. Slide 7?

22 MEMBER STETKAR: It just gives -- it gives
23 you a picture of what he's talking about, so the rest of
24 us who don't understand this can look at it.

25 MEMBER BROWN: The top part is the normal

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1 control. That's the three active sensors. And the EHC
2 is electro-hydraulic control/emergency trip function.
3 The bottom part is the independent primary function with
4 primary sensors. Does that help calibrate here, Mike,
5 or whoever --

6 CHAIRMAN CORRADINI: I just wanted
7 something in front of us because we are not going to
8 talk --

9 MEMBER BROWN: That's a great question. I
10 didn't get past page 5 of the presentation when I was
11 thumbing through it.

12 If you'll look inside, that bottom box, you
13 don't care as long as all of the systems are operational.
14 I've got two independent functions, so I can live with
15 that. If that bottom box is out of service, for whatever
16 reason, sensor failures, processor failures, fuse
17 blows --

18 MR. THOMAS: Surveillance testing.

19 MEMBER BROWN: -- whatever testing, says
20 it's not working right, now you decide to go on and
21 continue to operate with the upper system. What is not
22 shown in the top box is there are -- those three sensors
23 feed -- or upper and lower. Those are normal control
24 boxes. There's three of -- there are two or three of
25 those. Don't remember exactly the number.

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1 The bottom part of that upper section
2 there's three things called speed monitors. All three
3 of those sensors feed all three of the speed monitors.
4 So they are all tied together. Those three speed sensors
5 also feed the normal mode of operation. How they are
6 tied together -- I think they are tied together in the
7 upper one. I never got a figure of that, but based on
8 the text that I was able to read in a few places, it looks
9 like it's done by both -- there's a backup and -- there's
10 a normal and a backup channel, and all three feed all
11 in -- you pick the median.

12 MR. THOMAS: You have -- a signal from each
13 sensor goes into its processor.

14 MEMBER BROWN: That's right.

15 MR. THOMAS: And then that processor sends
16 that signal to the other two processors.

17 MEMBER BROWN: However it happens,
18 it's -- that's not show anywhere. It just shows a line
19 coming off the sensors going into the other boxes. The
20 detail is not clear as to how they're hooked up in the
21 normal function.

22 The problem is they are all hooked up.
23 Based on your picture that you gave us, they are all
24 hooked up to all three monitors in the overspeed trip
25 function, electrical -- the emergency one.

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1 So if you have what I would call not a
2 failure of a sensor or a processor per se, but an
3 anomalous noise, some other interaction from the sensor
4 getting fed into those three speed monitors, they can be
5 told, "I didn't see a trip." I'm not calling it a
6 software failure; it's just that you can provide a
7 signal, a noise. I've seen it happen, and that's the
8 other genesis of the concern I have.

9 That same noise gets into -- or that bogus
10 signal, corrupt signal, gets into the processors for the
11 normal speed control. It can tell those, "Raise the
12 speed of the TG set."

13 And I've been asked how in the world -- that
14 is just never going to happen. Well, in fact, it really
15 happened, real life. I had just finished a review of a
16 major governor program for the Navy, said, "Guys, you
17 don't have independence. They auctioneered their
18 suppliers, fed them to both places. Explain to me,
19 Brown" -- that's what the contractor and the Navy said
20 to me -- "how this -- have you ever seen this happen?"
21 Of course I hadn't seen it happen.

22 So they went ahead with the design, coupled
23 through the power supplies. About five months later one
24 of the ships had a major overspeed -- I mean, a major
25 overspeed action based on noise coming out of the power

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1 supplies, which disabled the overspeed trip and told the
2 normal speed control to raise the frequency -- to
3 increase steam. I won't say raise the frequency; I will
4 say increase speed -- increase steam to the turbine.

5 In the process of troubleshooting, somebody
6 pulled one particular power supply, which happened to be
7 the good one, which was holding the machine down -- in
8 other words, it was overriding the noise. As soon as
9 they pulled that out, the machine went to 149 percent
10 overspeed. Just managed to be tripped by an operator who
11 was standing out there.

12 So people -- and now the Navy went into a
13 major upgrade of all of their electronic speed controls,
14 and overspeed controls, to eliminate the lack of
15 independence from -- in other words, independence really
16 means independence. It doesn't mean common things
17 feeding common stuff, you know, both functions.

18 So that's the genesis of my overall concern
19 is, once the passive is out of service, with the existing
20 design, you no longer have an independent -- totally
21 independent overspeed function, electrical -- emergency
22 overspeed function from the normal control function.

23 And if the answer to this is, "Hold it." If
24 we take the passive one out of service for some reason,
25 we have three days to get it fixed or five days to get

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1 it fixed, the answer is, I probably wouldn't object
2 because there is a reasonable -- although I'm rarely ever
3 referred to as being reasonable, I would consider that
4 a reasonable thought process for an engineering manager
5 to go through and say, "Hey, look, see if it's something
6 simple that we can recover and finish operating through
7 the entire cycle."

8 But when somebody says it's okay to go for
9 six months or a year, or two years, through the entire
10 operating cycle, that seems -- and that is what was
11 implied by Table 3.5-1 in Chapter 3 of the DCD.

12 MR. THOMAS: Okay. You've made my
13 presentation.

14 MEMBER BROWN: I thought I'd try to --

15 MR. THOMAS: No, that's truly where I was
16 going to go. So let me go there real quickly and --

17 MEMBER BROWN: One other point is that --

18 CHAIRMAN CORRADINI: Short point.

19 MEMBER BROWN: No. This is whatever time
20 it takes me to put this point out. I have worked on this
21 now for four different Subcommittee meetings. I don't
22 want to do it again. Okay? Please. It will be short.

23 As is my normal approach to doing business,
24 viewgraphs don't -- and people telling me how something
25 is really going to happen don't play a whole lot based

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1 on -- I mean, somebody has to go out and design this stuff,
2 and it becomes disconnected from a discussion at a
3 Subcommittee meeting or even if -- and it's not in an RAI
4 any place right now where somebody can go grab their
5 hands.

6 And I noticed based on some other stuff you
7 all had made some changes to the DCDs requirements,
8 either the ITAACs and/or the whatever to show certain
9 things that the staff had brought up. And it is my hope
10 that whatever you are going to say would be reflected
11 either in the COL or documents or in the DCD documents.
12 Now, it is probably too late for the DCD documents. I
13 don't know; it was in Chapter 10. But I never -- with
14 this, I don't think anything is ever too late.

15 If your proposal is that -- not proposal,
16 but if your final part is it's only going to be for a
17 limited time, and we will limit it by procedure, which
18 people if it's out of service and they have some, you
19 know, less than infinite time to operate in that mode,
20 then it's a pretty straightforward approach. So that's
21 my short point.

22 MR. THOMAS: Okay. I went through exactly
23 that same thought process to -- struggling with this
24 question, and I think I wound up almost exactly the same
25 place. So I'm going to go through this real quickly and

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1 show you how I got there, and then we will talk about the
2 very last point that you made.

3 MEMBER BROWN: Okay.

4 MR. THOMAS: So maybe we ought to back up
5 a couple of slides. I know I'm going to repeat some
6 things here for the benefit of everybody else here, and
7 I'm going to do it very quickly.

8 We do have four functions that are speed
9 controlling functions that are very similar to the AP1000
10 design, for example. You have a normal speed control
11 system, which is designed --

12 MEMBER BROWN: One point.

13 MR. THOMAS: Yes, sir.

14 MEMBER BROWN: I did look at the AP1000
15 design two and a half years ago, three years ago, whatever
16 it was. They were in the unfortunate circumstance that
17 they didn't provide enough detail in their write-ups that
18 looked pretty simple based similar to your picture right
19 here without the internal boxes. And I didn't ask the
20 right question.

21 CHAIRMAN CORRADINI: Let him go through it,
22 though. Just so --

23 MEMBER BROWN: I am. I'm just saying, I
24 just -- I don't want to use AP1000 as a basis for saying
25 I think --

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1 CHAIRMAN CORRADINI: And I think that is
2 his point.

3 MR. THOMAS: I only bring that up to say
4 that this design is not unusual. It is probably --

5 MEMBER BROWN: Pretty much the same.

6 MR. THOMAS: -- the standard for, you know,
7 modern turbines today. But there are four speed control
8 functions -- the normal speed control and emergency trip
9 system, and power load ~~on~~ unbalance. Those are the
10 functions that are controlled by the EHC controller.
11 And as you pointed out, then there is an independent and
12 diverse, completely separate from the other system
13 of -- what is called a primary trip function. I think
14 unfortunately that may be a little bit of a misnomer, but
15 it is a backup. It is completely independent and
16 diverse.

17 MEMBER BROWN: It is lower than the
18 emergency --

19 MR. THOMAS: It's 110.

20 MEMBER BROWN: That is 111, and so that
21 is --

22 MR. THOMAS: But the point is, it's
23 separate, it's independent, it's an additional layer of
24 protection that depends on nothing from the other system.
25 So there are four speed control functions that we're

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1 talking about.

2 Now, go to the next slide. This is
3 describing the DCD. The first line of defense -- in
4 other words, if you do have an overspeed event, what is
5 expected to protect the machine first is the normal speed
6 control system, which limits the speed within these
7 parameters. And the power load on balance function,
8 which is basically a rapid load loss such as loss of the
9 generator breaker opening, it detects a difference
10 between your steam turbine chest pressure and generator
11 current, and actuates fast-acting solenoid valves to
12 dump the EHC system and protect you from overspeed.

13 And on the next slide we have what is called
14 second line of defense, which is the emergency trip
15 function. Again, that is associated with the primary
16 control system, and then the primary diverse trip
17 function.

18 They each employ two out of three logic, or
19 two -- or I'm not going to go through the details here.
20 There are multiple solenoid valves to ensure that you
21 don't have inadvertent tripping, but also to ensure that
22 you do get a trip function when one is required.

23 Let's go to the next slide. We have seen
24 this before. Now let's move on. So if we take out the
25 primary trip function, that added layer of protection,

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1 we are still left with three speed control functions.
2 Now, this is when I start to put myself in the position
3 of talking to the plant manager. How long can we
4 continue to operate like this?

5 Clearly, you have removed an important
6 safety function from the machine, and you want to
7 understand, you know, what condition you are in, how long
8 can we continue to operate like this.

9 I'm not going to hypothesize too many
10 circumstances. It could, of course, depend upon what
11 you found, whether it's something you think is simple to
12 fix, whether you've got spare parts available, whether
13 you think you can do it online or you've got to take the
14 machine offline, but there could be a variety of
15 circumstances feeding into that decision-making
16 process.

17 If we go to the next slide, generally, this
18 is acceptable. It is not an unacceptable position to be
19 in. First of all, these things are designed to be taken
20 out of service for surveillance testing. These are
21 requirements that we have to do. So periodically, for
22 short periods of time, you would take the system out of
23 service to test it and rely upon the other functions to
24 provide a degree of protection that you think is
25 acceptable.

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1 So operation for a "limited period of time"
2 with the primary trip system out of service is
3 acceptable. And this term "limited" is not defined, and
4 I think that is the question. What is reasonable? What
5 is appropriate?

6 If we go to the next slide --

7 CHAIRMAN CORRADINI: So before you go to
8 the next slide, are you two on the same page?

9 MEMBER BROWN: Roughly. I have a little
10 bit of disagreement on the power load on balance.

11 CHAIRMAN CORRADINI: But at least for what
12 he brought up, you're on the same page?

13 MEMBER BROWN: Yeah.

14 CHAIRMAN CORRADINI: Okay.

15 MEMBER BROWN: For the most part. I mean,
16 if you look at it from the standpoint of standard part
17 failures, then, yes. If you look for what I would call
18 unusual anomalies that may occur, then not necessarily
19 until I heard the end.

20 MR. THOMAS: I didn't want to get into the
21 discussion about, you know, we are still connected to the
22 grid and that. I think the power --

23 MEMBER BROWN: There are different things
24 that happen if you are on the grid or off the grid.

25 MR. THOMAS: There are some other

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1 considerations. And in researching this, you know, I
2 wanted to see, well, what does our insurer require?
3 There certainly -- obviously, this is a very expensive
4 machine. It's an important machine. And our insurer is
5 not comfortable with us operating in a condition like
6 this for a continued period of time. That's the term
7 that they use here.

8 And they require us to notify them if we were
9 going to do something like that, and there would be some
10 consequences associated with that. I don't know exactly
11 what those might be, but I point that out just to say
12 clearly there are other factors, in addition to the ones
13 that you brought up, that would be factored into this
14 decision.

15 Now, I think, finally, that we do, again,
16 periodically take these things out of service. The
17 terms "limited" and "continued operation" are not
18 explicitly defined. And in talking through this,
19 really, with myself and Scott and some others that are
20 familiar with these type of circumstances, I think my
21 advice to the plant manager under these circumstances is
22 that you can't operate like this for six months. You
23 can't operate like this for a month.

24 I think that this is something you can fix
25 today or tomorrow or, if we have a spare part that we have

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1 to get in and we can fix it this weekend when we can bring
2 the machine down during a low power situation, that a
3 period of five or six days would be reasonable under these
4 circumstances.

5 And my advice to him would be anything
6 longer than that would not be reasonable under these
7 circumstances.

8 So I think, you know, we have come to pretty
9 much the same place. You know, I would not be
10 comfortable recommending to my plant that we can operate
11 like this for an extended period of time. It's a
12 significant layer of protection, and you should not
13 operate with that not present, not functioning properly
14 under those conditions for a long period of time.

15 So I think I'm in pretty much agreement with
16 everything that you've said. Now --

17 MEMBER BROWN: With the exception of, how
18 do you determine "limited" and "continued operation" are
19 not explicitly defined. I mean, I have no problem with
20 what you just said. Five or six days, if I was in your
21 situation -- or that position, that is probably the
22 ballpark. You know, how long does it take me to get the
23 parts? What is this? Blah, blah, blah. Walkthrough,
24 is it simple to do once we -- but if it's longer than five
25 or six days, we've got to do something because we're

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1 putting ourselves in jeopardy for whatever the
2 circumstances are.

3 But relying on that without some licensing
4 condition or something, goes past it into a little bit
5 more formal context, to me is -- it's kind of saying,
6 "Well, trust me. This will work just fine. And don't
7 worry about it." And I guess I have a hard time walking
8 away from that standpoint.

9 I agree with you philosophically all the way
10 down with what you've said.

11 MR. THOMAS: The situation is not
12 dissimilar to -- I mean, I think we had the discussion
13 that this primary trip device, this independent device,
14 is sort of the equivalent of the mechanical trip device.

15 MEMBER BROWN: That was the argument we --

16 MR. THOMAS: There are circumstances where
17 that device might not be working, and you could find
18 yourself in exactly the same situation with a mechanical
19 trip device out there, which is common throughout most
20 of the fleet at the present time. But I don't know that
21 there are any particular restraints or tech spec
22 requirements or license conditions associated with that
23 situation that would be applicable to this situation. I
24 don't understand why this situation would be any
25 different.

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1 MEMBER BROWN: Let me answer that. It
2 depends, again, on -- and, again, this is -- what do the
3 backup systems look like, and what are their potential
4 vulnerabilities. If I had looked at your emergency
5 speed, overspeed, trip function, all three active
6 sensors coming in, also going to the normal but going into
7 the three-speed monitors, instead of all three feeding
8 each one, going to all of them, instead you see one sensor
9 going to each speed monitor and one power supply
10 independent going to each of those speed monitors.

11 I would have said, okay, because it is
12 fundamentally independent. The only connection is the
13 output of the active devices to the normal speed control.
14 But each of the trip functions, two out of three
15 downstream from that, are independent. They're
16 not -- from circumstances which I have actually
17 encountered in real life, not necessarily a single
18 individual failure of --

19 MR. THOMAS: Well, I believe they are
20 independent. They are not diverse.

21 MEMBER BROWN: Put the diverse aside.
22 Look, I'm not wrapped around the axle, once you get to
23 this point, on the diverse part. The real issue, the
24 protection, the major basis for operating safety systems
25 that are software -- particularly software-based ones,

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1 is independence. And it means independence.

2 Once you start contaminating cross-feeding
3 data from one processor to another, where part of that
4 data could not only impair its own but impair the other
5 two, becomes a major problem. That is a real problem.
6 That is a real problem, and that is the point of my -- I
7 am -- pardon?

8 CHAIRMAN CORRADINI: So I didn't want to
9 stop you. I have been counseled that we want to let you
10 have your --

11 MEMBER BROWN: My day in court?

12 CHAIRMAN CORRADINI: That would be a word.
13 But I just want to make sure, are you --

14 MEMBER BROWN: Yeah. You've heard -- I've
15 got it on the record --

16 MR. HEAD: We have a little bit more to add,
17 but that's -- and I would like to add that there are
18 two -- at least two regulations that are in play right
19 now. Okay? One is called the maintenance rule, okay,
20 and one is called the corrective action program. If we
21 have -- you know, if we have not made the decisions that
22 we just heard said, that we discussed, and we somehow
23 justified a six-month -- you know, being in this
24 condition for six months, I think that there are a number
25 of opportunities for that to undergo NRC scrutiny.

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1 A corrective action program that allows
2 this to take place, especially if we have, you know, other
3 individuals on the site that say, "Hey, that's -- we
4 should be in that condition," I think those are there,
5 and they're real. And I think they in many ways trump
6 even a redesign of this system, and that's the way -- the
7 reason we can talk this is that's the way we live right
8 now at an operating plant. And so --

9 CHAIRMAN CORRADINI: I think I know what he
10 just said, Charlie. Are you on the same page?

11 MEMBER BROWN: Those are amorphous.

12 CHAIRMAN CORRADINI: Let me try -- let me
13 just say as a third party, what I think Scott is saying
14 is your interpretation of this is correct. You guys seem
15 to be on the same page. So I don't understand it enough
16 to disagree. On the other hand, what you say is limited
17 and needed to be defined, Scott is saying can be defined
18 by an analysis through the maintenance rule, so that
19 something greater than X, whatever X is, is not going to
20 be allowed. That's what I interpret --

21 MEMBER BROWN: It's not clear that that
22 would happen through the maintenance rule. Okay?

23 CHAIRMAN CORRADINI: To me, on -- you
24 asked. The basis for the thing is safety systems should
25 be independent of your normal control modes.

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1 MEMBER STETKAR: Can I try something?
2 Number one, for the record, this is not a safety system.
3 It is not a safety system, Charlie.

4 MEMBER BROWN: Well, John, I am not going
5 to argue with you on that point. Safety system applied
6 to the main turbine --

7 MEMBER STETKAR: It's a protection system
8 for the main generator.

9 MEMBER BROWN: That's fine. It's an
10 overspeed trip. It's a safety system from that
11 standpoint.

12 MEMBER STETKAR: In your FSAR, there is
13 Table 3.5-1. That's in your final safety analysis
14 report, which is a licensing document, correct?

15 MR. HEAD: Yes, sir.

16 MEMBER STETKAR: Your final safety
17 analysis report is a licensing document?

18 MR. HEAD: Yes, sir.

19 MEMBER STETKAR: Thank you very much.
20 There is a table that indeed applies criteria that are
21 indexed to -- I'll call them reliability numbers. But
22 they are indeed criteria that are in a licensing document
23 that says, "I can operate for an infinite amount of time
24 if I satisfy Criterion A. I can operate until the next
25 outage if I satisfy Criterion B. I can operate for 60

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1 days if I satisfy Criterion C. And I can only operate
2 for six days if I satisfy Criterion D."

3 It is incumbent on you to demonstrate that
4 indeed you satisfy Criterion A, B, C, or D. But this is
5 pretty clear. It is not in something that is called the
6 technical specifications, which are written for the
7 safety-related stuff that is included in the design basis
8 safety evaluation in Chapter 15 and Chapter 6.

9 But it is certainly -- and, in fact, it is
10 more restrictive than some of the maintenance rule stuff.
11 It is sort of analogous to the -- and I always forget the
12 words that people use, but the reliability criteria that
13 they apply to the design reliability assurance program
14 equipment that some licensee -- some applicants have
15 proposed in their applications.

16 So there is, in a licensing document, a
17 commitment to apply these criteria, which is auditable
18 and enforceable by the staff. And it's incumbent on the
19 eventual licensee to demonstrate that indeed they meet
20 these criteria, which involves, you know, doing some sort
21 of an analysis work, and their criteria would apply if
22 something is out of service for maintenance, something
23 fails, something -- you know, anything. Anything that
24 can trigger you from Criterion A to B to C to D would need
25 to be evaluated.

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1 MEMBER BROWN: This table that you are
2 referring to is a requirement for probability of missile
3 generation for the ABWR standard plant. It's a
4 500-missile generation. It is not for other safety
5 functions. It's applied to the rotating machines.

6 CHAIRMAN CORRADINI: But isn't
7 that -- isn't these total -- aren't these all -- we're
8 talking the same thing.

9 MEMBER BROWN: Well, I'm talking about
10 rotating machines. That's what the issue is here. It
11 sounded like it was being applied on a larger scale
12 relative to overall analyses of things relative to safety
13 of the plant.

14 CHAIRMAN CORRADINI: But, I mean, turbine
15 missiles would fit within this criterion is what I'm --

16 MEMBER BROWN: Oh, no. This table that he
17 is talking about, it applies to the generation
18 of -- missile generation.

19 CHAIRMAN CORRADINI: Okay.

20 MEMBER BROWN: Okay? I'm not arguing with
21 that. It's just that this thing goes on to say that the
22 licensee is required to provide his calculational
23 methodology to the NRC -- that is stated somewhere in
24 here -- after the license is granted, whatever that
25 means.

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1 And I have a hard time believing that the
2 thought process and concept of independence is going to
3 be cranked into this calculation of the ability to -- of
4 probability.

5 CHAIRMAN CORRADINI: But I guess -- I'm not
6 an expert at all on this, but I think your worry fits into
7 the broader worry we had before of we want to see a
8 complete turbine missile analysis. And in the missile
9 analysis they are going to have to show that "limited"
10 falls into some category. Otherwise, they have to take
11 the system down. That's my interpretation.

12 MEMBER STETKAR: The turbine -- let me
13 just -- you know, I'm an analytical guy. I'm a PRA guy.
14 Nothing to me is independent. Something can always have
15 a common cause. I don't care whether it's hardware,
16 software, or anywhere.

17 The key is that if you do develop -- and you
18 do need to develop -- a turbine missile, quantitative
19 turbine missile analysis, and if that turbine missile
20 analysis is a true -- an end-to-end analysis, it goes all
21 the way from the speed sensors out through the stop valves
22 and all that kind of stuff.

23 You need, in that analysis, to account for
24 stuff called common cause failure. Charlie's concern is
25 one element of one type of common cause failure

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1 associated with the signal processing logic. Another
2 element is common cause failure of similar types of -- you
3 know, whether it's solenoid-operated valves, or whatever
4 other kind of operated valves. That is an analytical
5 requirement.

6 Charlie is saying he basically wants to make
7 sure that you account for that. If you do -- in other
8 words, if that analysis passes the completeness test, in
9 a sense, then that analysis forms the basis for you
10 determining whether you're in each of those different
11 operating -- whatever they're called -- criteria,
12 whether you meet the operating criteria A, B, C, or D that
13 are listed in that table.

14 So it's important that that analysis that
15 you submit, you know, three years after the COL is issued
16 is indeed complete, and somehow addresses these
17 concerns. After that, you know, if indeed that is the
18 case, this table in your licensing document does indeed
19 apply specific criteria for operating times in various
20 levels of degraded conditions.

21 MR. THOMAS: Well, that calculation you
22 mentioned I think would -- for missile generation from
23 turbines would address fatigue, stress corrosion
24 cracking, and overspeed type events. And those have to
25 be combined to come up with the numbers here.

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1 My understanding -- I don't know this for
2 a fact because we haven't done that calculation yet -- is
3 generally overspeed is a relatively small contribution
4 to that. No?

5 MEMBER STETKAR: It's usually the biggest
6 one, actually.

7 MR. THOMAS: Okay.

8 MEMBER STETKAR: It is
9 usually -- especially on monoblock rotors like you --

10 MR. THOMAS: I was just going to say, the
11 monoblock rotors are fairly --

12 MEMBER STETKAR: It's the overspeed -- the
13 stuff that we're talking about here is typically what
14 drives the boat.

15 MR. THOMAS: But I don't know that the
16 calculation would cover the scenario that we have
17 postulated here. It would generally, I assume,
18 consider -- and the system is designed to be able to
19 withstand any single failure, and it would probably
20 credit the overspeed protection capability based on that
21 single failure. I think that the situation we have here
22 where we take a system out of service, and then we
23 postulate some other possible failures, is probably a
24 little bit beyond what might normally be included in that
25 calculation.

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1 But I'm kind of on Charlie's side on that
2 table. I'm not sure that even if I came up with a number
3 greater than that that would put me in some other category
4 that I would sit there and tell my plant manager, "You
5 can operate for a month or six weeks or six months with
6 this situation," which is why I'm trying to tell you what
7 my judgment would be under the circumstances that you
8 postulated in this question. And I think that I'm in
9 agreement with you.

10 CHAIRMAN CORRADINI: But I just wanted to
11 make sure that we're all -- I mean, I understand -- I think
12 I've got Charlie's point. But are you and John on the
13 same page that it does fit within --

14 MEMBER BROWN: No. What he says -- he said
15 he likes the analytical PRA approach, and I believe that
16 at some point in the hierarchy of the architecture of your
17 basic systems that you depend on to prevent bad things
18 from happening, there is a streak of deterministic
19 thought process that fundamental design architecture
20 principles, as I have stated for reactor protection
21 systems, safeguard systems, "independence" means
22 independence. It doesn't mean passing information from
23 protection channel to protection channel.

24 So that's -- I don't think you ought to set
25 yourself up for the possibility of failure. So

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1 that's -- you asked me if John and I were on the same page,
2 and I would say for the most part, yes, but we have an
3 endpoint slightly different approach to satisfying the
4 end requirement.

5 CHAIRMAN CORRADINI: Okay.

6 MEMBER SCHULTZ: So you prefer a design
7 change --

8 CHAIRMAN CORRADINI: Or a definition of
9 "limited."

10 MEMBER BROWN: There are two points -- a
11 definition of "limited" or a minor design change. This
12 is disconnecting some wires.

13 MEMBER RICCARDELLA: Maybe I need to be
14 educated on this a little bit. You know, plants that I
15 work with a lot of times, you know, when they have a leak
16 in one of their pipes, or a vessel is cracked or something
17 like that, they tell me I'm going into something called
18 an LCO, a limited condition of operation, and --

19 CHAIRMAN CORRADINI: That is for safety.

20 MEMBER RICCARDELLA: Well, okay. I mean,
21 would you be happy if they said, "Well, if this happens,
22 I'm an LCO and" --

23 MEMBER BROWN: Yeah.

24 MEMBER RICCARDELLA: -- then I could only
25 operate for a certain number of days?

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1 CHAIRMAN CORRADINI: I am looking at the
2 person on the left and I would say no.

3 MR. HEAD: I am not going to put this system
4 in tech specs. That's what you would --

5 MEMBER BROWN: I knew that would be the
6 answer. That's why --

7 MEMBER STETKAR: It is not a safety system.
8 On the other hand, there is a licensing document that has
9 certain requirements in that.

10 MEMBER RICCARDELLA: So Category D in
11 that --

12 MEMBER STETKAR: Category D says that, you
13 know, people don't believe in numbers. If the
14 probability of a missile ejection event gets as high as
15 10 to the minus three per year, an increase of factor
16 of 100, you need to take the turbine offline within six
17 days or get back to your factor of 100. That's what this
18 says.

19 Now, it's not -- it is not a technical
20 specification. It is not a limiting condition of
21 operation, because those regulatory things don't apply
22 to this. But this is something that is auditable by --

23 MEMBER RICCARDELLA: It's a two-inch pipe,
24 so --

25 CHAIRMAN CORRADINI: It's different, but

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1 it's similar. But I think what I'm hearing between
2 Charlie -- I just want to make sure I qualify what is
3 agreed to and what is not agreed to. I guess what I'm
4 hearing from Charlie -- I want to make sure because we're
5 not going to settle this. I just want to make sure I
6 understand it, so that I can get it captured, which is
7 Charlie feels he'd like to see a number.

8 And John's point --

9 MEMBER BROWN: Or --

10 CHAIRMAN CORRADINI: -- or a change in
11 design.

12 MEMBER BROWN: To preserve independence.

13 CHAIRMAN CORRADINI: I got it. From
14 John's standpoint, Table 3.5.1 goes far enough to define
15 a probability, or I'll call it a reliability window that
16 if you don't fit into it you might shut down. And that
17 protects --

18 MEMBER RICCARDELLA: Within a certain
19 number of days.

20 CHAIRMAN CORRADINI: -- within a certain
21 number of days.

22 MEMBER BROWN: And the caveat was
23 that -- wasn't quite sure whether this overspeed trip
24 system function, that would really be captured in this
25 analysis.

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1 CHAIRMAN CORRADINI: And I hear the
2 applicant being totally agreeable to how you interpret
3 the design --

4 MEMBER BROWN: Yes.

5 CHAIRMAN CORRADINI: -- as we know it.

6 MEMBER BROWN: Yes.

7 MR. THOMAS: Not quite there on the signal
8 independence, but fundamentally I think we're in
9 agreement.

10 CHAIRMAN CORRADINI: Okay. So I'm not
11 sure we can go any further on this one today. I
12 understand it. I'm looking at Scott.

13 MR. HEAD: Well, I want to circle back to
14 the regulations, because we --

15 CHAIRMAN CORRADINI: I was waiting for you
16 to do that.

17 MR. HEAD: -- we can make a design change
18 to address this issue, and then I think there is another
19 issue. And that's why the maintenance rule is there for
20 any condition. That's the corrective action program is
21 there for any condition. And I really believe
22 that -- and, you know, Steve is speaking from experience,
23 that the people that are operating the plant, that
24 understand the exposure, can apply the expectations that
25 come with at least those two regulations and come up with

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1 the appropriate decisions based on whatever equipment is
2 out of service for this condition or some other
3 condition.

4 And I think that, like I say, we've been
5 living with those regulations for a number of years now.
6 They have been I think beneficial for the station and
7 public health and safety, and I think they're there. And
8 I don't think -- you know, they are not amorphous, and
9 they are real and decisions are made based on those every
10 day. So this would just be another decision.

11 Steve has been speaking more or less from
12 the heart from what he would be doing at the time, or has
13 done, and I think -- you know, I just -- I would like the
14 regulations to be on the table as we make this decision
15 or as you deliberate on this decision.

16 CHAIRMAN CORRADINI: Understood. Anybody
17 else?

18 MEMBER ARMIJO: I just hear -- I've been
19 listening to all of this stuff trying to figure out what
20 would be the best thing to do. Wouldn't it be
21 fundamentally better to just have the design, whether
22 it's governed by regulations or not, just if you had --

23 MR. HEAD: I don't think we are poised to
24 agree that the design that was being suggested is in fact
25 better. I don't think we are poised to do that.

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1 MEMBER ARMIJO: Okay. So you disagree
2 that, you know, it's independence and --

3 MR. HEAD: Now, there may be a design
4 uncertainty of --

5 MEMBER ARMIJO: -- this is --

6 MR. HEAD: -- scenarios that are better,
7 but we have chosen this design and we believe it is the
8 design that -- for the majority, overall design is what
9 we want to protect our turbine.

10 MEMBER ARMIJO: Okay.

11 MEMBER RICCARDELLA: Is this substantially
12 different from the 100 or so operating plants that are
13 out there?

14 CHAIRMAN CORRADINI: No.

15 MR. HEAD: What is different is this
16 clearly won't have the mechanical overspeed.

17 MEMBER RICCARDELLA: It has got two
18 electrical overspeeds as opposed to one electrical and
19 one mechanical?

20 MR. HEAD: Yes. Which we believe and I
21 think most people say is an enhancement to the protection
22 of the turbine, and that's why we're doing this.

23 CHAIRMAN CORRADINI: Okay.

24 MEMBER BALLINGER: But the mechanical
25 overspeed is independent.

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1 MEMBER BROWN: Well, they don't have one if
2 that's --

3 MEMBER BALLINGER: No, but I'm saying that
4 is an independent thing.

5 MEMBER RICCARDELLA: If that goes out of
6 service for some reason, if they are taken out of service,
7 then it's just like this, right?

8 MR. HEAD: Sometimes they go out of service
9 and you don't know it.

10 CHAIRMAN CORRADINI: Right.

11 MEMBER STETKAR: Everybody presumes that
12 this Rube Goldberg chunk of weights and stuff is the most
13 reliable thing in the world. It isn't.

14 MEMBER BALLINGER: It has only been for the
15 last 50 years.

16 MEMBER BROWN: Try 80 or 90 years.

17 MEMBER BALLINGER: Okay. Well, I'm 67,
18 so --

19 MEMBER BROWN: It relies on --

20 (Simultaneous speaking.)

21 MEMBER BALLINGER: And I was not rating
22 turbines when I was 12.

23 CHAIRMAN CORRADINI: I sense that we've
24 gone as far as we're going to go. So I suggest that we
25 go to another action item. I think I've captured it, and

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1 I'm sure my colleagues will make sure if I didn't capture
2 it they will capture me. So let's move on.

3 MR. THOMAS: All right. You wanted this
4 for your --

5 MEMBER BROWN: I am glad you appreciate
6 them, even though others don't.

7 (Laughter.)

8 MR. THOMAS: This one we have covered, you
9 know, before. There's a water level discussion.

10 CHAIRMAN CORRADINI: I thought we had
11 covered this.

12 MR. HEAD: We had, but we had a followup
13 action for us to put all of that information in the COLA,
14 because at the time the 3.7/3.8 review was going on, and
15 we explained to you what we did, and those changes have
16 been made, and, therefore, this -- and as Tom said this
17 morning, you know, this chapter is prepared to be closed.
18 So, but we have made those changes. We updated the COLA.

19 And the last one is for Dr. Hinze, if he is
20 on the line.

21 CHAIRMAN CORRADINI: I hope he is on the
22 line.

23 MS. BANERJEE: Dr. Hinze, can you hear us,
24 please?

25 (No response.)

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1 CHAIRMAN CORRADINI: We may need to ask
2 them to unmute him.

3 MS. BANERJEE: Yeah.

4 CHAIRMAN CORRADINI: We don't want to drag
5 him here from wherever he is.

6 MR. HEAD: Oh, I understand. As we took
7 the action item, it was simply to update the COLA with
8 a description of why two earthquakes is acceptable.

9 (Pause.)

10 CHAIRMAN CORRADINI: Give us one more
11 minute, and let us see if we can find our consultant.

12 (Pause.)

13 MR. HINZE: Hello?

14 CHAIRMAN CORRADINI: Professor? Are you
15 there?

16 MR. HINZE: This is Bill Hinze.

17 CHAIRMAN CORRADINI: Hi, Professor Hinze.
18 This is Mike. Nice to have you with us.

19 MR. HINZE: I am sorry, Mike, but I was
20 given the wrong number passcode, and I've been sitting
21 here trying to connect up to you people but without
22 success. So --

23 CHAIRMAN CORRADINI: Well, this is the
24 government, so we're doing very well. At least it's the
25 right day.

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1 MEMBER STETKAR: And you're in the right
2 country.

3 CHAIRMAN CORRADINI: Okay. All right.
4 We're all set. Scott.

5 MR. HEAD: We'll start with just some
6 background on 107 -- was in our discussion, previous
7 discussion, on 3.7/3.8 it was noticed that there were two
8 different seed earthquakes used, one by one of our -- the
9 architect-engineer, and another one by someone who is
10 supporting a different part of the project. And there
11 was two -- basically two different seed time histories
12 that were provided or used, and the question was asked
13 by Dr. Hinze about, why is that acceptable? And in that
14 meeting, we conveyed our rationale of why that's
15 appropriate and acceptable and give reasonable results.

16 And at the end of that, there was a request
17 that we would, you know, update a licensing document to
18 state that. And we went ahead and chose to update the
19 COLA and Section 3A.16.2. This is Rev 10 that went in
20 a couple of weeks ago, and so there is a -- you know, a
21 paragraph that describes, you know, the basis for doing
22 that, and why that is acceptable. So we've -- that has
23 been -- and the staff has reviewed it and confirmed that
24 it's there and it's acceptable. So --

25 MR. HINZE: May I ask if the word "basis"

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1 is the same as "reason"? Did you give a reason why there
2 were two different ones used? Because this is unusual
3 and potentially confusing.

4 MR. HEAD: Do you mean why from a business
5 perspective we had two different --

6 MR. HINZE: Well, why from a scientific
7 perspective or from any perspective. Why were two
8 different seeds used?

9 MR. HEAD: Well, either one would have been
10 acceptable by either organization. And so since it was
11 acceptable to use either one, either company would have
12 been free to do that. And so we haven't put a business
13 decision as to why we did that, and --

14 CHAIRMAN CORRADINI: Can I say it
15 differently? You're saying that either would have been
16 acceptable. It just turned out that two different bases
17 were used?

18 MR. HEAD: Yes, sir.

19 CHAIRMAN CORRADINI: Okay.

20 MR. HEAD: I mean, they could have used the
21 same one, but, you know, that would have been, you know,
22 just by luck.

23 MR. HINZE: Did you compare the spectra of
24 the two averages that you used?

25 MR. HEAD: I don't believe we

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1 compared -- what we've said is that both organizations
2 went back and --

3 MR. HINZE: Excuse me, but we were
4 told -- we were told at the July meeting that the results
5 would come out within one percent. But how was that
6 determined?

7 MR. HEAD: I'm going to dive into this,
8 Steve. You're going to have to help me.

9 MR. THOMAS: I'll try.

10 MR. HEAD: When you go through this
11 process, at the end of it all you have to still validate
12 that your earthquake and the results from that are
13 consistent with what you would expect. And both
14 organizations did that -- that after going through the
15 process, that there were consistent results.

16 MR. HINZE: I don't know what about what
17 they expect, but if -- if -- we are trying to determine
18 the very best possible ground motion response spectra,
19 and there is very little expectation there.

20 Well, I thoroughly agree that both the North
21 Ridge and the current are potentially useful for this
22 purpose. And I am pleased that you did make reference
23 to the basis for this, and I was hoping that you would
24 explain in the FSAR why the two different ones were used,
25 because I think that would be helpful to the person that

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1 analyzes the documents. But so be it.

2 CHAIRMAN CORRADINI: So, I'm sorry. So
3 you're all right with the fact that two bases are used,
4 not because --

5 MR. HINZE: Well, you know, I really
6 believe that both of them are useful in this regard. I
7 think the problem here, at least to my feeling, is that
8 you have used two without saying why you have used two,
9 and the net result is that anyone analyzing this would
10 have to raise a question about, would these produce the
11 same results.

12 And in the FSAR -- I have not seen what you
13 have written, but in the FSAR you pointed out that they
14 are -- give the same results or some percentage that give
15 the same results, and define how you arrived at that.

16 MR. HEAD: We didn't -- you know, there were
17 two different sets of buildings, two different
18 organizations that did it. There was really --

19 MR. HINZE: But there were two different
20 organizations that did it. So it was a selection that
21 was made by an individual.

22 MR. HEAD: By individuals.

23 MR. HINZE: All right. By individuals.
24 By a group that did the analysis for the diesel oil
25 facilities and for the containment building.

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1 MR. HEAD: Yes, sir.

2 MR. HINZE: So there were two different
3 groups that did that. Is that what you're saying?

4 MR. HEAD: Yes, sir. Yes, sir. At two
5 different times for two different project reasons.

6 MR. HINZE: I see. So --

7 MR. HEAD: Go off and do a certain set of
8 work, and they chose two different seed time histories,
9 and then go through the process to validate -- and this
10 is what I meant by the word "expected," that the results,
11 after you've done all of that, are consistent or as
12 expected, that you have built the appropriate result.
13 And there is a process to go through that that I
14 really -- you know, I really can't, you know, describe
15 in much detail.

16 MR. HINZE: Well, let me ask a question,
17 then. How consistent are the ground motion response
18 spectra at the diesel oil facility and oil -- fuel oil
19 facility and the containment? How consistent are they?

20 CHAIRMAN CORRADINI: I don't think they
21 have -- I think, Bill, they don't have that in front of
22 them now.

23 MR. HEAD: And I don't know what
24 consistent --

25 CHAIRMAN CORRADINI: By "consistent," do

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1 you mean if the --

2 MR. THOMAS: Well, one is the site-specific
3 analysis, and one was the one done for the generic DCD.
4 And so they're different in --

5 MR. HINZE: They are site-specific, are
6 they not?

7 MR. THOMAS: Really, there is no apples
8 comparison.

9 CHAIRMAN CORRADINI: I think you guys are
10 talking over each other. Can you repeat, Steve,
11 what -- can you repeat to Professor -- can you repeat what
12 you said?

13 MR. THOMAS: The original seed history used
14 by GE in developing the DCD was a generic for hypothesized
15 ground motion response spectra. The one that we did for
16 STP was a site-specific ground motion response spectra
17 developed through the Shack II process. So, I mean, the
18 results would not be comparable, and there would be no
19 real expectation that you would choose the same seed time
20 histories in doing those two different results. One is
21 generic for the .3G DCD, and the other is site-specific
22 for the .15G -- .13 site-specific.

23 MR. HINZE: Right.

24 MR. THOMAS: So I think the fact that those
25 were done by different organizations at different times

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1 for different purposes really -- there was no underlying
2 expectation that they would choose the same time
3 histories to do that.

4 But I think the underlying understanding is
5 that if they had used the same seed histories they would
6 have gotten comparable results. But we really don't
7 have anything that we could compare to say that it came
8 within one percent or two percent or any other numerical
9 comparison.

10 MR. HINZE: Mike, I am satisfied that the
11 applicant has provided a basis for the use of the two in
12 the SAR, and I think we will bring this to a conclusion
13 as far as I am concerned.

14 CHAIRMAN CORRADINI: Well, why don't we at
15 least -- let's close the loop by at least getting into
16 the language that is in Revision 10, so you can see what
17 was --

18 MR. HINZE: I would very much appreciate
19 that.

20 CHAIRMAN CORRADINI: I think that is
21 probably the way that I would make sure that you're
22 comfortable with this, because given the fact that we're
23 two different groups with two different ways in which
24 this was started, I don't see how -- unless they purposely
25 try to compare them, I don't think one can say they are

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1 comparable or not comparable. So I think the best thing
2 to do is to see what's written.

3 MR. THOMAS: Please read the change in
4 context with the whole section, not just by itself.

5 MR. HINZE: That's very reasonable.

6 CHAIRMAN CORRADINI: Okay.

7 MEMBER RICCARDELLA: Is it expected that
8 these ground motion response spectra are going to be
9 updated as a result of some of the ongoing work? I mean,
10 the NRC, the USGS, they are all updating their ground
11 motion responses.

12 MR. HEAD: No, sir. It's not that, but
13 we're previewing a February ACRS meeting, which I have
14 previewed before, that as part of one of the Fukushima
15 ACRS meetings we will show you the original ground
16 motion -- the original limiting curve that we are using
17 for the site, and we will show you the results of the CEUS,
18 the new source model, and the results of the new ground
19 motion attenuation. And we will show you there that our
20 original curve is still valid.

21 CHAIRMAN CORRADINI: Okay. And that's --

22 MR. HINZE: I would also add that there is
23 an increasing amount of strong motion information
24 available in COSMOS that is available generally, coming
25 from the CEUS, the Central and Eastern U.S. And this is

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1 much more applicable than would be trying to modify the
2 Western U.S. results.

3 And I think we will -- as I stated in my
4 report, I believe we will see that coming to fruition in
5 the -- hopefully in the near future.

6 CHAIRMAN CORRADINI: I think that -- I
7 think what you're saying is right. I just want to remind
8 everybody that we have a meeting scheduled, the
9 Subcommittee, specifically about what Scott had
10 mentioned.

11 MS. BANERJEE: February 20th?

12 MR. HEAD: Well, that's what I have been
13 told is currently scheduled. You don't have the SER on
14 it, so, I mean, you know, it's --

15 CHAIRMAN CORRADINI: February?

16 MS. BANERJEE: February 20th is tentative
17 date for that presentation of Chapter 2.5, Section 2.5.

18 MR. HEAD: Which will be combined with the
19 Fukushima discussion, because of the earthquake aspect.

20 My only offer on this is that, you know, we
21 have submitted this to the staff, and so I really think
22 it's more appropriate for the staff --

23 CHAIRMAN CORRADINI: I said it
24 incorrectly. The staff can pass this on to us. We
25 don't -- we don't need it from you.

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1 MS. BANERJEE: Yeah. I'll get Section 3A,
2 Appendix 3A, and send it to Dr. Hinze.

3 MR. HEAD: And I apologize, our expectation
4 for this, at least originally, was us just to confirm we
5 had done it. And I'm confirming that, but, obviously --

6 MR. THOMAS: We didn't bring any experts
7 with us is what he's trying to say.

8 CHAIRMAN CORRADINI: Okay. I think that's
9 it on your list. Is that correct?

10 MR. THOMAS: Yes, sir. We're done.

11 CHAIRMAN CORRADINI: So I don't have
12 anything. I'll turn to Tom. Tom, do you have anything
13 you want to talk about in terms of the action items?

14 MR. TAI: Yes.

15 CHAIRMAN CORRADINI: Relative to 34 and 86?

16 MR. TAI: Yes. This morning someone asked
17 about --

18 CHAIRMAN CORRADINI: Do you want to come up
19 here, or do you want to just take it from there?

20 MR. TAI: No. I think we can take it from
21 here.

22 CHAIRMAN CORRADINI: Okay. Go ahead.

23 MR. TAI: The question was, with respect to
24 the turbine inspection program, by doing leaky valve
25 inspection testing, is it going to impose additional

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1 risk?

2 I have John Honcharik here from the
3 Materials Branch, and maybe he can explain it, give you
4 a better answer than I did this morning.

5 MR. HONCHARIK: Hi. My name is John
6 Honcharik, and I think the issue was that they said they
7 didn't submit a turbine missile analysis. So part of
8 that was to put it in the license condition, and basically
9 the wording, the way it finally fell out, was that -- use
10 the language that is in the SRP about that they would have
11 to inspect their turbine rotor every other outage, and
12 also do the valve testing weekly for the SRP.

13 MEMBER STETKAR: What section, John, of the
14 SRP? I did a little search at noon, and I couldn't find
15 that quickly, certainly not in the section you referred
16 to.

17 MR. HONCHARIK: Oh.

18 MEMBER STETKAR: So what section of the SRP
19 is it actually specified in?

20 MR. HONCHARIK: It's in SRP 3.5.1.3.

21 MEMBER STETKAR: You know, I looked that up
22 at noontime and --

23 MR. HONCHARIK: And it's on page --

24 MEMBER STETKAR: Okay.

25 MR. HONCHARIK: -- 8.

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1 MEMBER STETKAR: I'm sorry. 3.5.1.3, page
2 8.

3 MR. HONCHARIK: Right.

4 MEMBER STETKAR: Thank you. I must have
5 missed it.

6 MR. HONCHARIK: So basically we just
7 enforced it to say you shall do what the SRP says until
8 you submit that.

9 MEMBER STETKAR: What is the basis for the
10 SRP?

11 MR. HONCHARIK: Well, that has been gone
12 for a long time.

13 MEMBER STETKAR: I don't care. What's the
14 basis for the SRP? We are dealing -- we are living in
15 the year 2013 right now. We claim that we use
16 risk-informed regulation, and it is well-known, at least
17 to those of us who do risk assessment, that every time
18 you trip the plant you are increasing the risk of an
19 accident.

20 So anything that you do to increase the rate
21 at which you trip that plant is increasing risk. And I
22 submit that a weekly test of those turbine valves,
23 regardless of materials, regardless of thermal cycles,
24 regardless of any deterministic analyses, is increasing
25 the risk to the health and safety of the public.

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1 So I'd like to understand how the staff
2 justifies putting the plant at that increased risk,
3 regardless of what is said in some piece of paper
4 somewhere. I'd throw that back as a challenge to the
5 staff. It has nothing to do with materials. It has
6 everything to do with plant safety.

7 MR. HONCHARIK: I mean, I hear you. But,
8 I mean, we just have to get back to you on that. Other
9 than that, I have no --

10 CHAIRMAN CORRADINI: Okay. But just from
11 the standpoint -- just so we have it down in our heads,
12 that kind of comes back to the thing we left Tom with
13 earlier this morning, which was that this weekly testing
14 requirement, although there, just has to be -- we have
15 to understand the justification. Whether it be the
16 staff justification or the SRP's justification, it would
17 confusing to us.

18 MR. HONCHARIK: Okay. But you are asking,
19 what is the justification for the SRP?

20 MEMBER STETKAR: Essentially.

21 MR. HONCHARIK: What is the basis for the
22 SRP?

23 MEMBER STETKAR: Yeah. Yeah.

24 MR. HONCHARIK: Because basically, you
25 know, the applicant will be submitting an analysis on --

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1 MEMBER STETKAR: We all understand that,
2 but the concern is putting something in a license
3 condition, regardless of whatever our expectation is in
4 terms of a submittal or the timing of that submittal
5 versus startup of the plant.

6 We want to be sure that something that is
7 specified by the staff in a license condition is indeed
8 not averse to plant safety. I mean, that's the bigger
9 issue here.

10 MR. HONCHARIK: Right. Yeah. Because I
11 know, I mean, it was based -- there was a lot of
12 information that was happening in the '80s and '90s. You
13 know, that happened. There were a lot of instances of,
14 you know, some overspeeds. Okay. And there were
15 numerous NUREGs, so, I mean, to go back to that, you know,
16 level of detail I don't know if that's the kind of level
17 of detail that you want or --

18 MEMBER STETKAR: Well, the problem is, back
19 in the '80s, I, you know, was a senior reactor operator
20 at a plant in the late '70s and early '80s, and, indeed,
21 each of our units -- it was at Zion, so I can talk about;
22 it doesn't exist anymore -- used to pretty much trip once
23 every six weeks or so from a variety of causes.

24 So a slight increase in the expected trip
25 frequency -- and, in fact, measurably, I was involved in

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1 one, testing the turbine valves occasionally was one of
2 the causes for those trips. I've forgotten how
3 frequently we used to test ours. I think it was once a
4 month, not four times a month.

5 Current plants pretty much run breaker to
6 breaker, most of them, without tripping. So we are
7 talking about zero trips in a year and a half to two years
8 or maybe one. So if we're making newer plants more
9 vulnerable to tripping two or three times a year, through
10 turbine -- you know, requiring people to cycle those
11 valves 50 times a year, we need to think about that.

12 So in the context of 2013, not in the context
13 of data from the '70s.

14 CHAIRMAN CORRADINI: So I guess I have a
15 different way of thinking about it, because you weren't
16 here earlier when we were asking about this. If you view
17 this as a requirement that will be easily satisfied
18 because it won't be built by the time it is -- by the time
19 this is satisfied, why not make this a fuel loading
20 condition? Why specify an arbitrary weekly testing
21 regimen, which you don't think will be exercised anyway?

22 MR. HONCHARIK: Are you saying, why didn't
23 we have a licensing condition to submit the analysis and
24 have it approved with the maintenance program?

25 CHAIRMAN CORRADINI: Yes.

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1 MR. HONCHARIK: Well, funny that you ask
2 that, but that's the way I had written it.

3 (Laughter.)

4 But the lawyers got to it and said, "Well,
5 we can't do that. Let's reverse it." So, I mean, I hear
6 you. That's how I had it originally specified, so I
7 guess I could take that back.

8 CHAIRMAN CORRADINI: And this is because
9 the reg guide is simply written differently, and this is
10 what was within your purview to do?

11 MR. HONCHARIK: Right.

12 CHAIRMAN CORRADINI: Okay. All right.
13 That's fair. Thank you.

14 MEMBER ARMIJO: You are vindicated.

15 CHAIRMAN CORRADINI: We've just gone full
16 circle to try to understand the justification. It
17 passes back down to the SRP. Okay. Fine.

18 Tom, go ahead. I'm sorry. We --

19 MR. TAI: No. I think we're done.

20 CHAIRMAN CORRADINI: Do you want to say
21 anything else about 107, since we went roundabout with
22 Scott over it?

23 MR. TAI: Okay. Well, I think I have our
24 reviewer here. Samir, are you still here? Can you add
25 a little bit more to those?

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1 MR. CHAKRABARTI: This is Samir
2 Chakrabarti. I was not the reviewer for 3.7, but I was
3 the reviewer for 3.8.

4 CHAIRMAN CORRADINI: You've got to get
5 closer to the mic.

6 MR. CHAKRABARTI: Yeah. I was --

7 CHAIRMAN CORRADINI: I am hard of hearing.

8 MR. CHAKRABARTI: I was not the reviewer
9 for Section 3.7. I reviewed Section 3.8 of the SRP. And
10 I had a discussion about the 3.7 reviewer on this issue,
11 and what I understand -- that the user completely
12 satisfied the SRP criteria for meeting the motion that
13 matches the response written.

14 And, yes, we did not also ask STP to make
15 a comparison that if same seed was used, what would be
16 the impact on the results? Because we did not believe
17 it was needed, and that is how we would have done in any
18 case. So, yes, the same could be used, but use of two
19 different seeds. Even you can use results also that
20 matches our -- or satisfies the data. So we are happy
21 with that.

22 CHAIRMAN CORRADINI: Okay. Thank you.

23 All right. Thank you. Professor Hinze?

24 MR. HINZE: Yes.

25 CHAIRMAN CORRADINI: Did you hear all of

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1 that?

2 MR. HINZE: No, sir. Couldn't hear it.

3 CHAIRMAN CORRADINI: Okay. So let me try
4 to repeat it. What was said is the staff were fine with
5 the different seeds. They did not expect a comparison,
6 and they are happy with the explanation given by the
7 applicant.

8 MS. BANERJEE: Because it meets the SRP
9 criteria.

10 MR. HINZE: Fine. Good.

11 CHAIRMAN CORRADINI: Okay. Tom, anything
12 else?

13 MR. TAI: No, I don't. But I'd like to
14 reiterate the two actions that I have. I can provide
15 Maitri with the 3-Alpha for Dr. Hinze.

16 CHAIRMAN CORRADINI: Okay.

17 MR. TAI: And I will follow up with John on
18 the justification for the weekly testing.

19 CHAIRMAN CORRADINI: And then on
20 our -- that's fine. That's good. What I have is we
21 ourselves have to do our own internal discussion about
22 how we interpret Table 3.5.1 and our own philosophy
23 differences. All right?

24 Okay. Do you have any other closing
25 statements? Otherwise, I was going to go around the

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1 Committee.

2 MR. TAI: No, I don't. But I would just
3 like to say --

4 CHAIRMAN CORRADINI: Oh, excuse me. I'm
5 sorry. We have a public comment. I apologize.

6 MR. TAI: Okay.

7 CHAIRMAN CORRADINI: I forgot. But go
8 ahead and finish, Tom. I'm sorry.

9 MR. TAI: Okay. No, I really don't have
10 much to add to it. But I would like to thank everybody.
11 Two persons I want to bring to ACRS Committee's attention
12 is Jennifer Dixon and Terry Spicher, who started the
13 review of the steam dryer. If it was not for these two
14 guys, I think we are in a lot of trouble. So appreciate
15 that.

16 CHAIRMAN CORRADINI: Okay. Thank you.
17 So --

18 MS. BANERJEE: Can I ask you a question?

19 CHAIRMAN CORRADINI: Sure.

20 MS. BANERJEE: The safety reason for
21 requiring all instrument measurements on Unit 4 to be the
22 same as Unit 3, what is this 3.9.2 question that Sam
23 asked?

24 MEMBER ARMIJO: Yeah. I'm going to bring
25 it up --

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1 CHAIRMAN CORRADINI: I don't have to worry
2 about it being an action item. This is internal to the
3 Committee. I rest assured that Sam is going to bring it
4 up.

5 MS. BANERJEE: Okay. Thank you.

6 CHAIRMAN CORRADINI: I am not worried about
7 him forgetting about it.

8 MEMBER ARMIJO: I won't.

9 CHAIRMAN CORRADINI: Okay. Right. So
10 can we open the line? Because I am informed that we
11 have --

12 MR. HEAD: Can I ask a question?

13 CHAIRMAN CORRADINI: Sure.

14 MR. HEAD: You know, on the turbine
15 overspeed, we are in sort of an unusual place, at least
16 from my perspective, and I'm just wondering, will we be
17 informed of how we're going to receive some feedback as
18 to, you know, what is our path forward? I mean, I can
19 see different scenarios that would be, you know,
20 time-consuming or, you know, that --

21 CHAIRMAN CORRADINI: I think the purpose of
22 at least -- and the Subcommittee will do this -- to get
23 everything out in the open, so at least I understand it,
24 I think -- now I think Charlie understood it from his
25 perspective, John understands it, I think I want to make

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1 more of the Subcommittee kind of get on the same plane
2 with it.

3 So I don't really know if I can tell you
4 where we are going to come down on it. My sense is that
5 we have to discuss it.

6 MR. HEAD: Not where, but just --

7 CHAIRMAN CORRADINI: But when we do come
8 down about it, you'll hear about it immediately.

9 MR. HEAD: Okay.

10 CHAIRMAN CORRADINI: So my thought
11 is -- and, again, I am just projecting -- we have a meeting
12 scheduled in February. We are trying to write something
13 up, so we bring the whole new Committee, the new members
14 as well as the members that forget, up to speed on where
15 we sit about any sort of open items or internal
16 discussions we have. This will be one of them.

17 MR. HEAD: Okay.

18 CHAIRMAN CORRADINI: The turbine missile
19 analysis is one. The turbine overspeed some of us think
20 fits into the turbine missile analysis. It might fit
21 separately, but that was one. The issues relative to the
22 steam dryers is another. So we will have this sort of
23 discussion when we bring up kind of this internal
24 document to kind of get ourselves up to speed on the
25 history. And that will be probably in the next couple

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1 of months.

2 MR. HEAD: Okay. So if there is feedback
3 available at that meeting, we'll get it.

4 CHAIRMAN CORRADINI: You betcha.

5 MR. HEAD: Okay. Thank you.

6 CHAIRMAN CORRADINI: And that is in the
7 third week of February.

8 MS. BANERJEE: February 20th.

9 MR. HEAD: Okay.

10 CHAIRMAN CORRADINI: Okay?

11 MR. HEAD: Thank you.

12 CHAIRMAN CORRADINI: No problem. So I
13 think -- before I go to the Committee comments, I want
14 to get the public comment, if I could. And I think
15 somebody is on the line listening. Can we open the line
16 up so we can get the public comment? I don't know who
17 is --

18 MR. HINZE: No one is on the bridge.

19 CHAIRMAN CORRADINI: Oh. No one is on the
20 bridge. Okay. So we have no one. Okay.

21 So now, with that, you can close the bridge
22 line, and we'll go around to hear from the Committee.
23 Professor Hinze, did you have any more that you wanted
24 to say?

25 MR. HINZE: No, I don't believe so. Thank

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1 you.

2 CHAIRMAN CORRADINI: Okay. But we will
3 see you in February, I know, because you'll want to hear
4 about these various seismic issues.

5 MR. HINZE: Amen.

6 CHAIRMAN CORRADINI: Did you say "Amen"?

7 MR. HINZE: I did that.

8 CHAIRMAN CORRADINI: Amen, then.

9 Pete?

10 MEMBER RICCARDELLA: I don't have any
11 comments. It looks like a lot of great work. I just
12 hope we get around to building this plant in my lifetime.

13 MR. HEAD: Thank you, sir.

14 CHAIRMAN CORRADINI: John. Or Ron.

15 MEMBER BALLINGER: I don't have any
16 comments. I hope they build the plant, too.

17 MEMBER ARMIJO: Yeah. I think they have a
18 great steam dryer. Other than that, I'll move on.

19 CHAIRMAN CORRADINI: Steve?

20 MEMBER SCHULTZ: I didn't have the time
21 this morning to thank both the applicant as well as the
22 staff on the detailed not only calculations and work that
23 they have done related to the steam dryer and the reactor
24 internals, but also the presentations that were given to
25 us this morning. I really appreciated the level of

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1 detail and the expertise that went into all of that. So
2 I thought that was good, and I think, from my perspective,
3 we have the closed items that have been addressed, and
4 we have some open items that have been listed. I am glad
5 that we are putting together a document that is going to
6 bring everyone up to speed. I think that's a good idea.

7 CHAIRMAN CORRADINI: John?

8 MEMBER STETKAR: I don't have anything
9 more. Thank you.

10 CHAIRMAN CORRADINI: Charlie?

11 MEMBER BROWN: Nothing.

12 CHAIRMAN CORRADINI: You two are awful
13 silent. That concerns me.

14 Okay. So I have from my list, I wanted to
15 thank NINA and the staff for today and talking about
16 Section 3.9.2. I kind of agree with Sam that I think this
17 is a fairly robust design, and, really, I don't see any
18 concerns.

19 I know what I have listed is things that we
20 will bring up, hopefully we will have something to
21 comment back to you by February, is the question about
22 how far we go relative to additional confidence for the
23 steam dryer. And Sam will -- I think Sam has kind of
24 volunteered to take the action item to remind us of that
25 when we have further discussion.

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1 We will want to write something, whenever
2 we have a formal letter report, about the turbine missile
3 analysis. And we are looking forward to the
4 justification as to why the licensing condition is what
5 it is.

6 And then I think we still owe NINA and the
7 staff some sort of Committee posture on this turbine
8 overspeed. I think I finally understand where Charlie
9 is coming from, and the different ways to look at it. So
10 I appreciate Charlie's time on that.

11 Other than that, I don't have any other
12 comments. Thank you all very much, and I think we can
13 adjourn early.

14 (Whereupon, at 2:22 p.m., the proceedings
15 in the foregoing matter were adjourned.)
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Presentation to the ACRS Subcommittee

South Texas Units 3 and 4 COL Application Review

**SER Phase 4 Chapter 3
“Design of Structures, Components, Equipment, and
Systems”**

November 22, 2013

Staff Review Team

- **Project Managers**

主

George Wunder, Lead PM, DNRL/LB3

主

Tom Tai, Chapter PM, DNRL/LB3

- **Technical Staff Presenter**

主

Samir Chakrabarti, SEB2

主

Overview of Chapter 3 COLA

SRP Section/Application Section		Open Items or Confirmatory Items	
		Item Numbers	Status
3.1	Conformance with NRC GDC	None	
3.2.1	Seismic Classification	CI 03.02.01-2 CI 03.02.01-3 & CI 03.02.01-5	All confirmed and closed
3.2.2	Group Classification	CI 03.02.02-10 CI 03.02.02-11	All confirmed and closed
3.3.1	Wind Loadings	CI 03.03.01-1 CI 03.03.01-9	All confirmed and closed
3.3.2	Tornado Loadings	CI 03.03.02-4 CI 03.03.02-6, CI 03.03.02-7, & CI 03.03.02-9	All confirmed and closed
3.4.1	Flood Protection	None	
3.4.1	Flood Protection	None	
3.4.2	Analytical and Test Procedures	OI 03.04.02-9	Closed
3.5.1.1	Internally-Generated Missiles (Outside Containment)	None	

3.5.1.2	Internally-Generated Missiles (Inside Containment)	None	
3.5.1.3	Turbine Missiles	CI 03.05.01.03-1	Confirmed and closed.
3.5.1.4	Missiles generated by Natural Phenomena	None	
3.5.1.5	Site Proximity Missiles Except Aircraft	None	
3.5.1.6	Aircraft Hazards	None	
3.5.2	SSCs to be Protected from Externally-Generated Missiles	None	
3.5.3	Barrier Design Procedures	CI 03.05.03-2	Confirmed and closed.
3.6.1	Postulated Piping Failures in Fluid Systems Inside and Outside of Containment	CI 03.06.01-3	Confirmed and closed.
3.6.2	Determination of Break Locations and Dynamic Effects Associated with the Postulated Rupture of Piping	CI 03.06.02-1	Confirmed and closed.

3.7.1	Seismic Input	None	
3.7.2	Seismic System Analysis	None	
3.7.3	Seismic Subsystem Analysis	None	
3.7.4	Seismic Instrumentation	None (IBR)	
3.8.1	Concrete Containment	None	
3.8.2	Steel Components of the Reinforced Concrete Containment	None	
3.8.3	Concrete and Steel Internal Structures of Steel or Concrete Containments	None	
3.8.4	Other Seismic Category I Structures	None	
3.8.5	Foundations	None	
3.9.1	Special Topics for Mechanical Components	None	
3.9.2	Dynamic Testing and Analysis	None	
3.9.3	ASME Code Class 1, 2, and 3 Components, Component Supports, and Core Support Structures	OI 03.09.03-6 & OI 03.09.03-7	Closed Closed

3.9.4	Control Rod Drive (CRD)	CI 03.09.03-4	Confirmed and closed.
3.9.5	RPV Internals	None	
3.9.6	Testing of Pumps and Valves	CI 03.09.06-1, -2, -3, -4, -6,	All confirmed and closed.
		OI 03.09.06-5	Closed
3.10	Seismic and Dynamic Qualification of Mechanical and Electrical Equipment	CI 03.10-1	Confirmed and closed.
3.11	Environmental Qualification of Safety Related Mechanical and Electrical Equipment	CI 03.11-7 & 3.11-7	Confirmed and closed.
3.12	Tunnels	CI 03.12-1	Confirmed and closed.
3.12S	Piping Design Review	None	
3.13	Secondary Containment and Divisional Separation Zones-Barrier Considerations	None	
3.13S	Threaded Fasteners – ASME Code Class 1, 2, and 3	None	

Chapter 3 Phase 2 (October 2010)

Open Items

Open Items	Issue and Resolution
03.04.02-9	Design control and verification of Category I water-tight doors. STP considered the 40 ft. DBFL as the design basis.
03.09.03-6	Availability of risk-significant component design specifications. Issued resolved by January 2011 audit.
03.09.03-7	Pressure loading on the strainer from SRV discharge and the basis for this load. ITAAC (Table 3.0-14) added to verify in design report.
03.09.06-5	IST table (3.9-8) to reflect latest ASME OM code IST program requirements.

Chapter 3 Subsections with Significant Revisions Since Phase 2

- Subsections 3.2.1 and 3.2.2
Revised for clarity and reflect status of other subsections
- Subsections 3.3.1, 3.3.2, and 3.5.1.4
Revised to add departure STD DEP 3.5-2 addressing hurricane wind (RG 1.221 issued October 2011)
- Subsection 3.5.1.3
Revised to include a LC to impose inspection of the turbine rotor every other outage and weekly valve testing until a turbine missile analysis is submitted for approval consistent with SRP
- Subsection 3.9.1
Revised to add computer code ACSTIC2 identified in 3.9.2 review
- Subsection 3.9.4
Revised to address audit issues identified in 3.9.3 review

Chapter 3 ACRS Action Items

- **ACRS Action Item 34 – Provide ACRS 3.9.2 Technical Reports**

Submitted all WCAPs in October 2013

- **ACRS Action Item 86 – WRT turbine rotor - consider SRP revision to address changing technology related to FATT and Cv energy at minimum operating temperature**

Coordinated with NRR and acknowledged the request and need.

- **ACRS Action Item 107 – STP seismic design includes two earthquake seeds**

STP FSAR 3A.16.2 has been revised to provide basis for using two earthquake seeds (Northridge Earthquake for site specific structures). Two time-histories meet SRP acceptance criteria.

Conclusion

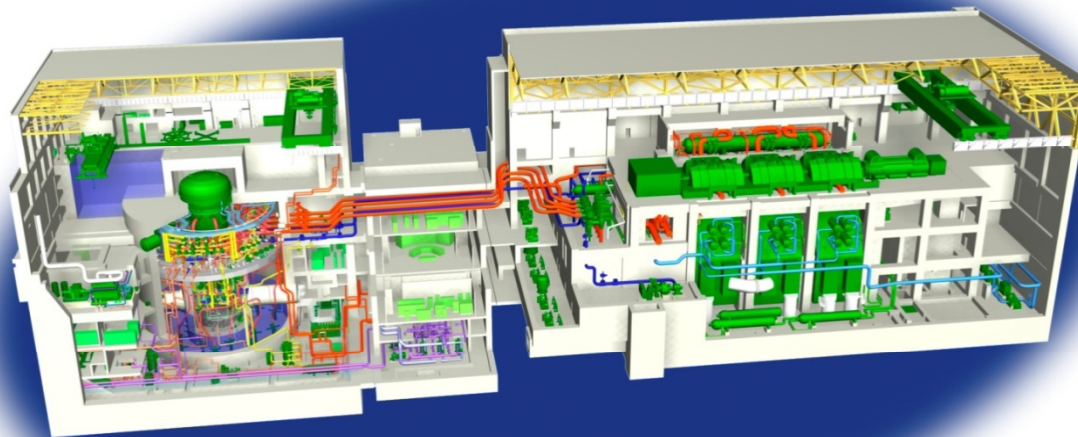
- No open technical issues in Chapter 3 review
- Two license conditions identified in Phase 4
 - ♦ In Subsection 3.5.1.3 to impose turbine rotor inspection and valve testing intervals consistent with SRP until turbine missile analysis is submitted for approval
 - ♦ In Subsection 3.9.2 to impose power ascension test to ascertain loads on steam dryer and reactor internals are acceptable
- Revision 10 of the FSAR received 10/29/2013



South Texas Project Units 3 & 4

Presentation to ACRS ABWR Subcommittee:

ACRS Action Items



ACRS Action Item #87

Show that other trip functions preclude any common mode failure (e.g., generating a false input of “zero turbine rpm”) of normal turbine speed control and emergency overspeed trip functions, while the primary overspeed trip function is taken offline (passive sensors, no automatic trip).

Restating the Question

Since the normal EHC/Emergency Trip Function with three active speed sensors produces an alarm for an abnormal speed input and a turbine trip for 2/3 abnormal speed inputs, and since the backup Primary Trip Function only provides alarms (no turbine trip) for speed sensor failures, then, why is removing the backup Primary overspeed trip system from service for trouble shooting acceptable?

Background

Similar to the AP1000 design and others, the turbine control system has four functions to protect against turbine overspeed.

1. Normal Speed Control,
2. Emergency Trip System,
3. Power Load Unbalance (PLU),
4. Primary Trip Function (Independent and Diverse)

Speed Control Functions

First Line of Defense (Limits speed to 2% below 110% trip setpoint)

A. Normal Speed Control

- At 105% EHC closes Turbine Control Valves
- At 107% EHC closes Intercept Valves

B. Power Load Unbalance

- At 40% difference between power (high pressure turbine exhaust steam pressure) and load (generator current), fast closure of turbine control and intercept valves (fast acting solenoids)

Speed Control Functions (Cont'd)

Second Line of Defense (Limits speed to 120% of rated speed)

- A. EHC/Emergency Trip Function (111%)
- B. Primary (Diverse) Trip Function (110%)

Each system:

- Employs 2/3 logic
- Trips two solenoids on the respective Emergency Trip Device (ETD)
- Closes Turbine Stop, Control, Intermediate Stop, Control Valves and Extraction Steam Non-Return Valves

Turbine Overspeed Trip Systems

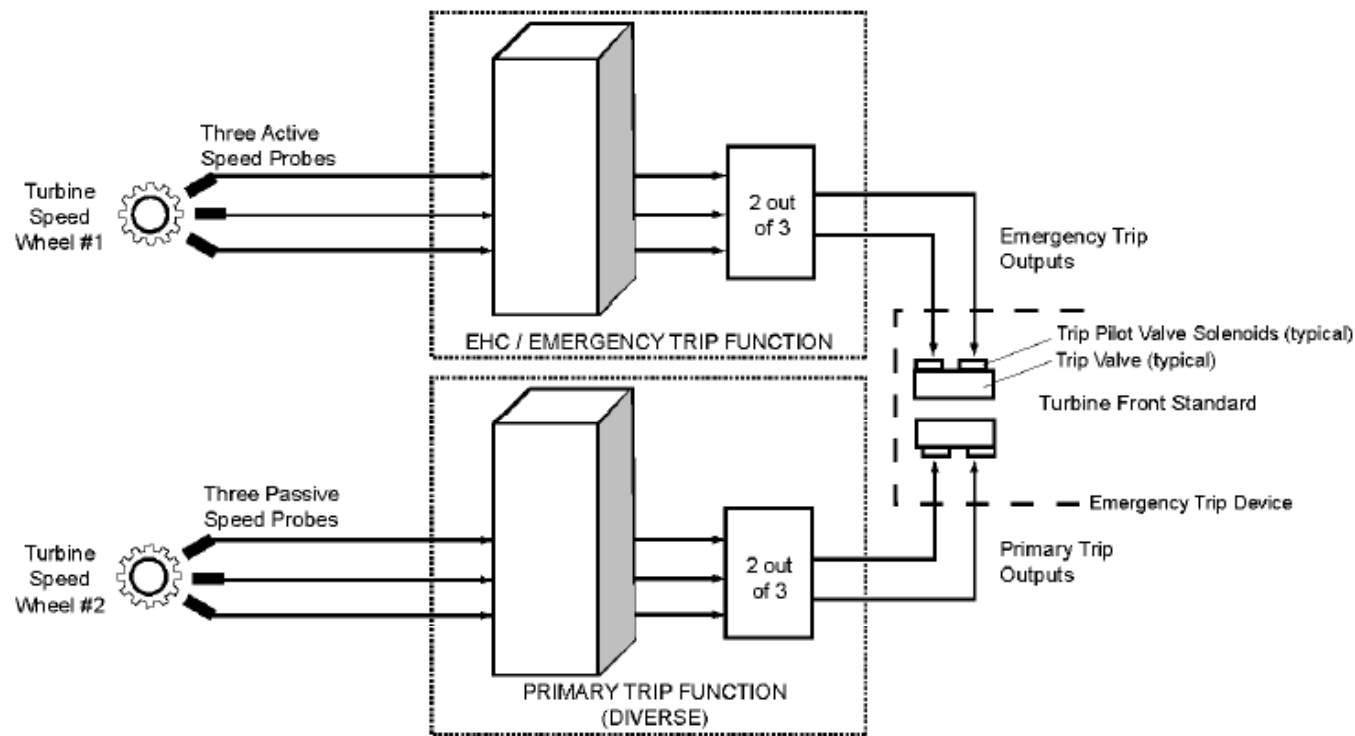


Figure 10.2-5 Turbine Overspeed Trip System Functional Diagram

Available Protection Without Primary Trip System

If the Primary Trip Function is out of service, there are three operable speed limiting control functions remaining:

- Normal Speed Control (active speed sensors, normal valve closure)

- Power Load Unbalance (does not rely on speed sensors, fast acting solenoid valve closure)

- Emergency Trip Function (active speed sensors, emergency trip valve)

Designed for Required Out-of-Service Periods

- As described in the FSAR, many of the components of the various turbine control systems are routinely taken out of service for a “limited” period of time for testing.
- This is acceptable because other redundant functions are available to provide adequate protection.

Conclusions

Operation for a “limited” period of time with the Primary Trip System out of service is acceptable due to the availability of the

- (1) normal speed control,
- (2) power load unbalance, and
- (3) emergency trip system functions to prevent turbine overspeed.

Other Considerations

Insurance Loss Control Standards require that owners SHALL report Adverse Conditions to Nuclear Service Organization (NSO) when they are identified.

Reportable conditions are those which, if allowed to continue uncorrected, could result in a significant property damage incident or loss and may include ... continued operation with failed or defeated safety devices (except those undergoing routine maintenance or calibration), which could lead to a turbine water induction incident or turbine overspeed event.

Closing Thoughts

- The purpose of online diagnostics, surveillance testing and alarms is to alert the operator of an abnormal condition.
- The objective is to restore the equipment to an operable condition.
- Online troubleshooting and repairs can be accomplished in a reasonable time, if reasonable protection exists.
- The terms “limited” and “continued operation” are not explicitly defined.

ACRS Action Item #58

During the November 30, 2010 ACRS Subcommittee meeting NINA clarified various water level parameters discussed in Chapter 3 and how they were derived. Action Item #58 was closed pending NRC verification that COLA changes were made.

The COLA changes to Chapter 3.0 were made and are reflected in COLA Revision 10.

ACRS Action Item #107

During the July 9, 2013 ACRS Subcommittee Meeting, NINA clarified why two different seed time histories were used in the COLA. The follow-up action from the meeting was for NINA to provide a clarifying discussion in the COLA.

The Revision 10 of the COLA contains a discussion in Section 3A.16.2 “Design Time Histories” regarding the use of the two different seed time histories.

Questions and Comments

