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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

US-APWR SUBCOMMITTEE

+ + + + +

TUESDAY

MARCH 4, 2014

+ + + + +

ROCKVILLE, MARYLAND

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

COMMITTEE MEMBERS:

JOHN W. STETKAR, Subcommittee Chairman

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

JOY REMPE, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

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1 DESIGNATED FEDERAL OFFICIAL:

2 GIRIJA S. SHUKLA

3

4 ALSO PRESENT:

5 EDWIN M. HACKETT, Executive Director, ACRS

6 PERRY BUCKBERG, NRO

7 JOHN CONLY, Luminant

8 TODD EVANS, Luminant

9 TOM HICKS, MNES

10 ATSUSHI KUMAKI, MNES

11 SAM LEE, NRO

12 KENJI MASHIO, MNES

13 MASATOSHI NAGAI, MHI

14 KHOI NGUYEN, NRO

15 HIROKI NISHIO, MHI

16 MASANORI ONOZUKA, MNES

17 NGOLA OTTO, NRO

18 BOB REIBLE, Luminant

19 JEFFREY SCHMIDT, NRO

20 RYAN SPRENGEL, MNES

21 REBECCA STEINMAN, MNES

22 RUTH THOMAS*

23 YUKEN WONG, NRO

24 DONALD WOODLAN, Luminant

25 *Present via telephone

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

(1:01 p.m.)

CHAIRMAN STETKAR: The meeting will now come to order. This is a meeting of the United States Advanced Pressurized Water Reactor Subcommittee. I'm John Stetkar, Chairman of the Subcommittee Meeting.

ACRS Members in attendance are Steve Schultz, Dennis Bley, Charlie Brown, and Joy Rempe. Mr. Girija Shukla of the ACRS Staff is the designated federal official for this meeting.

Subcommittee will discuss Chapter 14 Verification Programs of the Safety Evaluation Report associated with the US-APWR design certification and Comanche Peak Combined License Application.

We'll hear presentations from Mitsubishi Heavy Industries, Mitsubishi Nuclear Energy Systems, Luminant, and the NRC Staff. Subcommittee will gather information and analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the full Committee.

And rules for participation in today's meeting have been announced, as part of the Notice of this meeting, previously published in the Federal Register.

Parts of this meeting may need to be closed

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1 to the public to protect information proprietary to
2 Mitsubishi, or MNES, or other parties. I'm asking the
3 NRC Staff and the Applicant to identify the need for
4 closing the meeting before we enter into such
5 discussions and to verify that only people with the
6 required clearance and need to know are present.

7 The transcript of the meeting is being kept
8 and will be made available, as stated in Federal
9 Register Notice. Therefore, we request the
10 participants in this meeting use the microphones
11 located throughout the meeting room when addressing the
12 Subcommittee.

13 The participants should first identify
14 themselves and speak with sufficient clarity and volume
15 so that they may be readily heard. A telephone bridge
16 line has also been established for this meeting.

17 To preclude interruption of the meeting,
18 the phone will be placed in a listening mode during the
19 presentations and Committee discussions. For the
20 benefit of the folks on the bridge line, if we do need
21 to close the meeting for anything proprietary, we'll
22 have to close you off from the proceedings.

23 I will give you an opportunity at the end
24 of the meeting, if you have any comments that you'd wish
25 to make, I'll open up the bridge line at that time for

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1 your comments.

2 Please silence your cell phones. And
3 before we begin, I'd like to thank everyone, MHI,
4 Luminant, the staff. This has been a very, very
5 difficult meeting to get into our schedule. I
6 appreciate everyone's efforts to allow us to have this
7 meeting.

8 And then we had the weather come and add
9 some additional surprises, so I really appreciate all
10 of the effort that everyone has made to make this
11 meeting happen and actually get here. I know some of
12 you probably have some interesting stories, especially
13 from yesterday.

14 We'll now proceed with the meeting and I'll
15 see if NRO Management would like to make some opening
16 remarks?

17 MR. BUCKBERG: Good afternoon. My name
18 is Perry Buckberg, I'm the Lead Project Manager for the
19 US-APWR Design Review and now for the Comanche Peak COLA
20 Review.

21 I wanted to thank the ACRS, for the
22 opportunity to present both COLA and the Design Chapter
23 14 today, very short notice for the COLA. And also,
24 given less time in between the two meetings this
25 Subcommittee, Full Committee for Chapter 14. So thank

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1 you, gentlemen and ladies. We're looking forward to
2 our presentations today and on Thursday, as well. Let
3 me turn it over to my Branch Chief.

4 MR. LEE: Good afternoon. My name is Sam
5 Lee. And for the record, we've had some changes in
6 personnel in Licensing Branch II, so I'm the relatively
7 new Branch Chief for Licensing Branch II and I also want
8 to add my thanks for this meeting and for the support.

9 By the way, the more important members of
10 the staff have maintained and so Ngola Otto is still
11 here as Chapter 14 PM and I believe also the technical
12 staff and their branch chiefs have maintained their
13 positions, so the rest are still here.

14 CHAIRMAN STETKAR: And that's important.
15 Good. Thank you. Ryan, do you have anything to say?

16 MR. SPRENGEL: Good afternoon. I think
17 it's instinctive to say good morning. But I'll echo
18 the things for flexibility on both the arrangement of
19 the meeting and the Thursday meeting, as well, full
20 committee, as well as, actually having the meeting
21 today, so that's a big plus.

22 And my only other thing would be just to
23 remind the Committee and make sure we're on, kind of,
24 the same page of the activities. US-APWR will be
25 having a slowing down of our efforts, but remaining

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1 committed to the US-APWR Design Certification.

2 So we've been in continuing talks with the
3 staff about how the slowdown will take place and one
4 of the key milestones will be coming up at the end of
5 March where we'll, basically, be in our slowdown mode
6 period.

7 And we'll be working on a limited number
8 of activities at a time, ideally, focus on one at time.
9 And we're working with the staff to organize those
10 efforts about what areas are focused on.

11 For the Members' awareness, I mean, right
12 now our first targeted area is Chapter 18, HFE, and so
13 that would continue with our interactions with the
14 staff leading to a meeting with the ACRS.

15 CHAIRMAN STETKAR: That's, I think, it's
16 very useful for us to know, because I did a quick count
17 last night and I think as far as the design
18 certification, our Subcommittee, we'll have the full
19 Committee Meeting on Thursday to cover a number of the,
20 a couple of the chapters, but the Subcommittee has
21 heard, I believe, 17 and, let's call it 17-and-a-half
22 chapters.

23 There are a couple of sections of Chapter
24 3 that we haven't covered of the design cert, we've not
25 covered, as you mentioned, Chapter 18, and there's

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1 Chapter 1, the general introduction and overview, those
2 are the only three that we've not finished off in this
3 phase of our review.

4 And in terms of, kind of, our following the
5 review process, getting through this phase is, I think,
6 important to both of us, because it gives us, at least,
7 completeness, in terms of how to look at all elements
8 of the design.

9 And it gives you the opportunity to get at
10 least our feedback on all of the chapters, so I'm glad
11 to hear that you're going to be following Chapter 18,
12 that's good.

13 MR. SPRENGEL: It's interesting. I guess
14 we always count positive going up, but it is interesting
15 to look at how few we do have left.

16 CHAIRMAN STETKAR: There's not many left,
17 that's --

18 MR. SPRENGEL: Yes, that's --

19 CHAIRMAN STETKAR: -- and there is not
20 much left. It's just sad that the slowdown is
21 happening in calendar time when it is.

22 MR. SPRENGEL: Yes. Well, we are still
23 committed and we will go forward. The other one I
24 wanted to highlight is the Finds Topical Report.

25 CHAIRMAN STETKAR: Yes.

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1 MR. SPRENGEL: We're working with the
2 staff to finish the SER for the Finds Topical Report
3 and then bringing that to the Committee, as well.

4 CHAIRMAN STETKAR: Good. Good.

5 MR. SPRENGEL: And that, you know, of
6 course the topical report is kind of even a better
7 place, because that kind of stops that review --

8 CHAIRMAN STETKAR: Right.

9 MR. SPRENGEL: -- at a good stopping point
10 and that would feed into our Chapter 4 afterward. So
11 I'll go ahead and turn it over to Becky.

12 MS. STEINMAN: All right. Good
13 afternoon. We're happy to be back, yet again, putting
14 in another chapter. As you've already pointed out,
15 we're here to discuss Chapter 14 on Verification
16 Programs today and, of course, the corresponding Tier
17 1 material that goes with that.

18 As you'll note on the slide here, there are
19 two sections of Chapter 14 that were not included in
20 the Staff's SE, 14.3.2 is related to Section 3738 of
21 the DCD, the structural aspects, and 14.3.9 is related
22 to HFE.

23 Those two areas were left out at this
24 point, because the technical review is still ongoing
25 and intention is that we would bring the Chapter 14

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1 aspect of those to the ACRS at the same time that we
2 would bring that technical area to the ACRS, so 14.3.9
3 would come back with HFE work, 14.3.2 would come back
4 with the 3738 work.

5 For those of you that may not already know,
6 my name is Rebecca Steinman and I'm the Licensing
7 Engineer responsible for Chapter 14 and I'll be the
8 primary presenter today.

9 I have brought some excellent technical
10 support with me today to help answer any questions you
11 might have, Tom Hicks, here on my left, Kenji Mashio,
12 on my right, both representing MNES, and Hiroki Nishio
13 from MHI Japan. And then, of course, we have Ryan and
14 other support members from MNES to help us along today,
15 as well.

16 We're not going to spend any time on the
17 acronyms, but this should help out for anybody who
18 doesn't know what they are. So the presentation today
19 is going to focus on an overview of the US-APWR
20 Verification Programs, including the initial testing
21 program and MHI's approach and methodology for
22 developing ITAAC.

23 The table of contents for Chapter 14 is
24 basically divided into three sections, as shown this
25 slide. There are no slides in our presentation for DCD

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1 Section 14.1, because this section contains no
2 technical information in the DCD.

3 Today I'll be providing an overview of the
4 test abstracts, since it's not practical to provide
5 presentation details for each one of the test program
6 descriptions in 14.2.

7 And similarly, in terms of 14.3 in the
8 ITAAC, we will obviously not be going over all the
9 individual ITAAC, but we will be talking about the
10 development plan and methodology for how those are
11 developed.

12 Although we're not going to go over each
13 item in detail during the presentation we, of course,
14 have people in the room who are available to answer
15 questions, so if any of the members have specific
16 questions on a specific test program abstract, or on
17 a particular ITAAC, or other Tier 1 area, please feel
18 free to ask as we move along.

19 So let's go ahead and get started with
20 Section 14.2 on the Initial Plant Test Program. MHI's
21 test program follows Reg Guide 1.68, Revision 3, for
22 both scope and the specifics of implementation.

23 It includes the testing of unique US-APWR
24 design features and transient performance tests to
25 demonstrate the plant can meet the performance

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1 criteria, as well as operate within the required safety
2 limits.

3 Exceptions to Reg Guide 1.68 are described
4 in DCD Appendix 14(a), and as it's noted here on the
5 slide, the actual conduct of the test program is the
6 responsibility of our COL licensee.

7 MHI's applied the standard definitions for
8 defining the major phases of the initial test program,
9 such as construction testing, preoperational testing,
10 and startup testing.

11 I don't think there are any significant
12 deviations in the basic descriptions that we're going
13 to provide to you today, or the information that's in
14 the DCD.

15 Similar to other vendors, MHI is
16 determined that constructions testing is not within the
17 scope of Section 14.2, however, the division of
18 responsibilities for that testing and the
19 administrative controls associated with that are
20 discussed in a technical report called the US-APWR Test
21 Program Description Technical Report, which is
22 MUAP-08009.

23 In the pre-construction test phase, we'll
24 be demonstrating to functionality of SSCs after the
25 construction testing completes, but before fuel load.

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1 Preoperational test include, when practical, the
2 incorporation of surveillance test and the use of the
3 permanent plant operating procedures to help plant
4 personnel involved in these activities gain experience
5 on the US-APWR systems.

6 These tests are generally performed at
7 cold conditions. And preoperational tests that are
8 performed at elevated system pressure and temperature
9 are identified as hot functional tests.

10 Startup tests are performed after the
11 completion of the preoperational testing. The startup
12 test include both steady state and transient test.
13 These tests are designed to demonstrate adequate
14 performance of the nuclear steam supply system and
15 other systems at various power levels.

16 So now that we've confirmed that MHI's
17 essentially standard uses of the major phases of the
18 initial test program, let's get into some of the details
19 of the preoperational testing objectives, which are
20 listed on this slide.

21 The preoperational testing is designed to
22 demonstrate that SSCs operate in accordance with design
23 and all operating modes for the full design operating
24 range of the plant.

25 They are supposed to verify interactions

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1 between systems and components and ensure that they are
2 consistent with the expected design bases. We
3 validate, to the extent practical, the plant response
4 transients, failures, or malfunctions, and they
5 demonstrate the performance of safety-related SSCs and
6 design features during both normal and anticipated
7 abnormal operating conditions.

8 DCD Table 14.2-1 includes 115
9 preoperational tests. Tests abstracts for these tests
10 are provided in DCD Subsection 14.2.12.1. The
11 preoperational tests include manual and automatic
12 operation of systems and components and alternate, or
13 secondary modes of control and operation,
14 demonstration of inspected system operation following
15 a loss of power and in degraded modes for which the
16 system is designed to remain operational, verification
17 of proper functioning of instrumentation and controls
18 permissive and prohibit interlocks and equipment
19 productive devices and testing of system vibration,
20 expansion and restraint.

21 All of the test abstracts that are
22 described in the DCD are pulled together in accordance
23 with Reg Guide 1.68. And to ensure that the tests are
24 conducted in accordance with established methods and
25 appropriate acceptance criteria, the plant and system

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1 preoperational test information are made available to
2 the NRC at least 60 days before their intended use.

3 The general objectives of the startup
4 tests include the performance of a controlled and safe
5 initial core loading, achievement of initial
6 criticality in a controlled and safe manner, assurance
7 of that plant operation remains within the design and
8 operating parameters, both at low power and subsequent
9 power ascension testing, confirmation of the
10 operability of plant systems and design features that
11 could not be completed during the previous
12 preoperational testing age, and assurance that the
13 integrated dynamic response is in accordance with the
14 design for the various plant events.

15 Startup testing is conducted in four
16 phases, as indicated on this slide. Again, DCD Table
17 14.2-1 summarizes the 50 tests that are associated with
18 these four phases of startup testing.

19 The test abstracts for initial fuel
20 loading and pre-criticality testing are discussed in
21 DCD Subsection 14.2.12.2.1. The abstracts for the
22 initial criticality tests are discussed in Section
23 14.2.12.2.2. Low power abstracts are provided in the
24 following subsection 14.2.12.2.3. And the power
25 ascension test abstracts are provided in 14.2.12.2.4.

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1 First-of-a-kind tests are performed to
2 provide the unique performance of parameters for any
3 new design features. For the US-APWR there are four
4 first-of-a-kind tests that have been identified.

5 These are the Reactor Internals Vibration
6 tests, the Rod Cluster Control Assembly Misalignment
7 Measurement and Radial Power Distribution Oscillation
8 test, the Natural Circulation test, and the Pressurizer
9 Surge Line Hot Functional Test Performance test.

10 CHAIRMAN STETKAR: Rebecca.

11 MS. STEINMAN: Yes?

12 CHAIRMAN STETKAR: I'll let you finish the
13 next slide and then ask.

14 MS. STEINMAN: Okay. Because of the
15 standardization for the US-APWR design, the parameters
16 tested in the first-of-a-kind test will not change from
17 plant to plant, unless the tests are performed only on
18 the first plant containing the unique design.

19 The COL applicant for the plant is
20 therefore responsible for performing all four of the
21 first-of-a-kind tests that were described on the
22 previous slide. Subsequent COL applicants are not
23 required to perform the Reactor Internal Vibration
24 Test, or the RCCA Misalignment Measurement, or Radial
25 Power Distribution test.

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1 For the Natural Circulation test and the
2 Pressurizer Surge Line Hot Functional test, the COL
3 applicant must either satisfactorily justify the
4 applicability of the previous first-of-a-kind test to
5 their plant, or they must repeat the test themselves.

6 CHAIRMAN STETKAR: That second bullet on
7 this slide kind of explains the subtlety between what's
8 called a first-of-a-kind test and what's called
9 prototype test in the DCD, the prototype test are three
10 and four, the first-of-a-kind are one and two.

11 But I had a question that you might be able
12 to help. Why is testing of the advanced accumulator
13 not considered either a first-of-a-kind or prototype
14 test for this plant?

15 It sounds to me like a unique design
16 feature that would satisfy, at least, your definition
17 of a first-of-a-kind test. So I had two questions.
18 The accumulator is, to me, a real questions.

19 A subsidiary question is, perhaps the gas
20 turbine generators only because, to my knowledge, that
21 particular type of equipment has not been used as an
22 emergency power supply for plants in the United States,
23 even though they are used in Japanese plants.

24 MS. STEINMAN: Correct.

25 CHAIRMAN STETKAR: But I'm somewhat more

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1 curious about why the accumulator is not on the list
2 on Slide 11?

3 MS. STEINMAN: Okay. Hiroki Nishio?

4 MR. NISHIO: For the accumulator,
5 we -- this is Nishio with MHI. For accumulator, we
6 perform every time, it would run, we will perform --
7 just to see if --

8 CHAIRMAN STETKAR: Okay. So it
9 prints -- okay. That would explain it, is if every COL
10 applicant must --

11 MR. NISHIO: Yes.

12 CHAIRMAN STETKAR: I'm going to have --

13 MEMBER BLEY: First-of-a-kind you only
14 have to perform --

15 CHAIRMAN STETKAR: Yes.

16 MEMBER BLEY: -- things you --

17 CHAIRMAN STETKAR: Yes. Although,
18 let's -- I have several questions on specific tests.
19 Since I actually read through all of those tests
20 abstracts you're going to have to suffer me.

21 But I think before I get into the questions
22 on the specific tests, that explains why it's not a
23 First-of-a-kind test, but it does lead into one of my
24 questions on the accumulator testing.

25 Let's see if we can get through Section

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1 14.2 in your presentation, because that's the next
2 section you talk about, ITAAC, and at that point I want
3 to ask about --

4 MS. STEINMAN: Okay.

5 CHAIRMAN STETKAR: -- certain questions
6 on specific testing.

7 MS. STEINMAN: All right.

8 MEMBER SCHULTZ: But --

9 CHAIRMAN STETKAR: We'll revisit the
10 accumulator at that time. Unless --

11 MEMBER SCHULTZ: One question here on this
12 topic, Rebecca, the statement is that Tests 1, 2 are
13 not performed but the lessee would provide a
14 justification, results were applicable.

15 How in fact would that be done, is there
16 specification guidance provided as to how that would
17 be done, especially for demonstrating that the Reactor
18 Internal Vibration is not different than the original
19 testing, or the Misalignment Measurement is not
20 different than the original testing?

21 MR. HICKS: I believe there's discussion
22 in the COLA about the Vibration and what you have to
23 do to not have to do that test, or do parts of it, or
24 instrumentation, right?

25 MEMBER SCHULTZ: Is it the level of

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1 completeness that is different between the initial
2 testing, the first-of-a-kind testing, than what would
3 be done to demonstrate that the results are applicable
4 for the second end applicants?

5 MS. STEINMAN: All right, so my
6 understanding is that the very first plant has a very
7 detailed set of First-of-a-kind and then they basically
8 have to do a verifications to demonstrate that all of
9 the testing results and the design match up for any
10 plant that comes after that.

11 MEMBER SCHULTZ: All right.

12 MS. STEINMAN: I mean, you're asking about
13 what the details of that verification --

14 MEMBER SCHULTZ: No, and maybe --

15 MS. STEINMAN: -- process are?

16 MEMBER SCHULTZ: -- maybe that's going to
17 be derived somewhat from the First-of-a-kind test, so
18 maybe I'm asking too early, I'm not sure. But I'm
19 interested to understand --

20 (Simultaneous speaking.)

21 MEMBER SCHULTZ: -- why and how one would
22 determine that we don't have to do the first-of-a-kind
23 test for those particular pieces of testing.

24 MS. STEINMAN: I believe Tom is correct
25 that it's spelled out in the COLA and he's looking --

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1 MR. HICKS: Yes, I'm not positive, but I
2 thought that we, there was a discussion about that in
3 there, about what they would -- we may have to do it
4 when we --

5 MEMBER SCHULTZ: You don't have to --
6 (Simultaneous speaking.)

7 MEMBER SCHULTZ: We don't have to find it
8 now, but that's my question.

9 MR. HICKS: Yes.

10 MEMBER SCHULTZ: I'd appreciate some
11 elaboration on that. Thank you.

12 MS. STEINMAN: All right. So the startup
13 test include both steady state and transient tests and
14 these tests are designed to demonstrate adequate
15 performance of the nuclear steam supply system and
16 other systems to handle significant plant
17 perturbations.

18 This slide summarizes several of the
19 transient tests for the US-APWR. These include the RCS
20 flow coast-down test, rod ejection, dynamic automatic
21 turbine bypass control, natural circulation test,
22 remote shutdown, loss of offsite power at a greater than
23 ten percent power, plant trip from 100 percent power,
24 and 100 percent load rejection test.

25 The final slide that we have for the

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1 initial program test overview is a slide about the fact
2 that there were no open items for this section
3 identified in the SE. So at this point, I think
4 Chairman Stetkar has some specific questions about
5 individual tests he would like to discuss.

6 CHAIRMAN STETKAR: I do. I don't quite
7 know how to do this, so I'll just launch into it. We
8 recognize, first of all, that the summary information
9 in the DCD is fairly high level, so I'll try to keep
10 questions focused at that level.

11 Let's go back to the accumulator. When I
12 read the accumulator test, which is Number 57,
13 14.2.12.1.57, the acceptance criteria were pretty high
14 level, so as the discharge performances, as specified
15 in the design specifications.

16 And I read the test, it just basically
17 says, well, from the minimal level, I open up the valve
18 and make sure that it gives me flow. And that's pretty
19 much it.

20 I make sure that the check valve works and
21 all that sort of thing. That's sort of a standard
22 accumulator test for anybody's tank of pressurized
23 water.

24 There are characteristic equations that
25 are used in the safety analysis to evaluate the flow

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1 characteristics of this accumulator and we've had quite
2 some discussions about those. And Dr. Banerjee is not
3 here, so I'm not even going to attempt to use the
4 appropriate language.

5 It was my understanding, because the
6 parameter values in those characteristic equations are
7 derived from, at most, half scaled tests. It was my
8 understanding that fairly comprehensive tests would be
9 performed of the full scale as-built, as-installed
10 accumulator to confirm that, indeed, the
11 extrapolations from the half scale test to the full
12 scale test still held, in terms of the capitation factor
13 and flow coefficient, for example.

14 I did not see any testing to do that,
15 specifically. And that's both the characteristic
16 equation for the high flow regime, the transition from
17 the high flow to the low flow and the low flow regime,
18 because there are assertions made in the topical report
19 and in the safety analyses that those partial scale test
20 information will scale --

21 MS. STEINMAN: Correct.

22 CHAIRMAN STETKAR: -- essentially,
23 literally as to the full scale. And I thought it was
24 our understanding that the full scale testing, at least
25 for the first plant would confirm those four

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1 characteristics.

2 That's why I came back to this
3 First-of-a-kind type of testing that I was expecting
4 to see more extensive flow verification testing
5 throughout both the high flow and the low flow regimes
6 than what I could interpret anyway from that one test
7 of the accumulator.

8 MR. HICKS: Well the test description just
9 refers back to Chapter 6.

10 CHAIRMAN STETKAR: It does.

11 MR. HICKS: And I think the intent is that
12 you would, the test would encompass the design --

13 (Simultaneous speaking.)

14 CHAIRMAN STETKAR: Well sometimes it's
15 difficult to read to the intent, because when I read
16 the SER, and this is going to be a question for the staff
17 that they may want to be careful about.

18 MS. STEINMAN: Okay.

19 CHAIRMAN STETKAR: In the SER it says, the
20 response to RAI 941-6465 question 14.03.04-50 says, the
21 applicant stated that the characteristic equation in
22 its uncertainty are not part of the design acceptance
23 criteria, since neither is dependent on the as-built
24 equipment, as documented in MUAP-07001, which is that
25 topical report.

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1 That statement tells me that you don't
2 believe that those characteristic equations need to be
3 verified in the as-built design, unless I'm
4 misinterpreting something.

5 MS. STEINMAN: Well the characteristic
6 equations actually are included in Tier 1 and they are
7 included, as testing, as part of some ITAAC.

8 CHAIRMAN STETKAR: Yes.

9 MS. STEINMAN: They're ITAAC that verify
10 specific design tolerance and various aspects of that
11 and then there are a series of ITAAC, which is what I
12 was trying to search for to find the numbers for you
13 and I have it. I found the table with the
14 characteristic.

15 CHAIRMAN STETKAR: Yes, I didn't go
16 through all of the ITAAC because I --

17 MS. STEINMAN: Right.

18 CHAIRMAN STETKAR: -- I was assuming that
19 a lot of the ITAAC and they will be satisfied by the
20 preoperational tests and --

21 MS. STEINMAN: Right.

22 CHAIRMAN STETKAR: -- you know all those
23 others --

24 MS. STEINMAN: But I think there's a
25 specific ITAAC associated with the question that you're

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1 asking and that's what --

2 CHAIRMAN STETKAR: If you could find them
3 I'd appreciate that, because --

4 MS. STEINMAN: I will definitely look them
5 up and get you the numbers.

6 CHAIRMAN STETKAR: -- that was one of the
7 questions. As I said, that's why I raised it in terms
8 of the first-of-the-kind issue. So thanks. I would
9 appreciate that.

10 MR. HICKS: Sure.

11 CHAIRMAN STETKAR: One of the, a couple of
12 the tests, actually, look at reactor coolant pump
13 coast-down performance. There is a pre-op test, it's
14 Number 3, that looks at, it's actually part of hot
15 functional test. Let me read my notes here, because
16 I have too many notes, before I just start babbling.

17 The essence of my question is, the only
18 test that I could find that looked at coast-down
19 characteristics of the reactor coolant pumps was a
20 pre-criticality test that essentially de-energizes all
21 four pumps and verifies the LOOP flow performance after
22 loss of power to all four pumps.

23 What I didn't see is any tests that
24 verified LOOP flow performance if I trip only one
25 reactor coolant pump. That's important, because

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1 there's a low flow trip reactor trip signal.

2 And if the flow performance, for some
3 reason, if the flow doesn't decrease as fast as assumed
4 in the safety analysis that could be a problem.

5 I didn't find any tests that looked at that
6 issue, trip one and only one reactor coolant pump and
7 measured the flow. I wonder, they have to be, you know,
8 a hot functional test or something, once you're up to
9 pressure and temperature with all the pumps running

10 So that's one item. Again, a lot of these
11 are detailed questions you'll probably have to take
12 back --

13 MR. HICKS: Right.

14 CHAIRMAN STETKAR: -- unless you have
15 something right off the top of your head.

16 MR. HICKS: Okay.

17 CHAIRMAN STETKAR: Let's skip over some of
18 these that are probably too detailed. We've had some
19 discussion, and the Committee's letter also mentioned
20 this about positive suction head requirements for both
21 the safety ejection pumps and the containment spray RHR
22 pumps.

23 I could not find any testing when I looked
24 at the methods or the acceptance criteria that indeed
25 verified that the net positive suction head required

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1 values for the containment spray RHR pumps were
2 consistent with what a vendor may tell you they might
3 be. I looked at both the RHR part of those tests and
4 I looked at the containment spray part of those tests
5 and none of them address NPSH.

6 MR. HICKS: Well there's one in Tier 1,
7 it's in Section 2.4.5.1 on the RHR, it does testing of
8 the RHR core spray pumps.

9 CHAIRMAN STETKAR: 2.4.5.1 of Tier 1?

10 MR. HICKS: Yes.

11 CHAIRMAN STETKAR: So it's an ITAAC.

12 MS. STEINMAN: It's in the ITAAC.

13 CHAIRMAN STETKAR: Yes, I kind of ran out
14 of gas by the time I got done reading all of the --

15 MS. STEINMAN: Look at ITAAC 8f.

16 CHAIRMAN STETKAR: ITAAC, which?

17 MS. STEINMAN: 8f.

18 CHAIRMAN STETKAR: 8f, like Frank?

19 MS. STEINMAN: That is correct.

20 MR. HICKS: Right. Yes, it'd be in --

21 CHAIRMAN STETKAR: Thank you.

22 MR. HICKS: Right, it'd be in the table.

23 MS. STEINMAN: It would be in the table,
24 but associated with that section.

25 CHAIRMAN STETKAR: Thank you. Yes, as a

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1 preface, as I said, I read through all of the test
2 abstracts. By the time I got done doing all of that
3 I ran out of gas, so I didn't look at the tables or the
4 ITAAC up in Tier 1.

5 MS. STEINMAN: Right.

6 CHAIRMAN STETKAR: Settle up that one.

7 MR. HICKS: One thing I'll just point out
8 is that, you know, the test descriptions again are very
9 high level --

10 CHAIRMAN STETKAR: That's --

11 MR. HICKS: -- and point back to this
12 section. They may not specifically call out that in
13 the test description, but it would be in the system
14 description that it refers back to.

15 CHAIRMAN STETKAR: In --

16 MR. HICKS: Some of these in ITAAC --

17 CHAIRMAN STETKAR: In some of those case
18 I tried to go back to the system descriptions and some
19 places I did find, checked off my boxes --

20 MR. HICKS: Yes.

21 CHAIRMAN STETKAR: -- some places I
22 didn't. I'm trying to highlight the places where --

23 MR. HICKS: And anything in ITAAC would
24 have a corresponding pre-op test associated with it.

25 CHAIRMAN STETKAR: Yes, and that's --

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1 MR. HICKS: Yes.

2 CHAIRMAN STETKAR: See, that's the
3 assumption that I used. That if I went through all the
4 pre-op tests and the hot functional and the low power,
5 that I would basically cover all of the ITAAC, that's
6 why I didn't bother looking at what things might be
7 listed in ITAAC that were not necessarily obvious in
8 the other testing programs.

9 MR. HICKS: The problem is the test
10 descriptions --

11 CHAIRMAN STETKAR: Okay.

12 MR. HICKS: -- in some cases are not as
13 detailed as the ITAAC are.

14 CHAIRMAN STETKAR: That's why I'm raising
15 these questions, because there's time --

16 MR. HICKS: Okay.

17 CHAIRMAN STETKAR: -- available to flush
18 out those details, obviously. Here's an interesting
19 question that is something, I don't bring when we're
20 looking at Chapter 9, because I didn't think of it then.
21 And I looked in Chapter 9 and I couldn't find any
22 information about it either, so here's the case where
23 I did try to track it back in to Chapter 9.

24 There was a test of the essential chilled
25 water system pre-op test, it's Number 60. And one of

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1 the acceptance criteria is that the operating essential
2 chillers and pumps continue to run in the standby
3 essential chillers and pumps start upon the receipt of
4 an ECCS actuation.

5 So you basically line a system up with the
6 two normally running chillers and pumps, get ECCS, make
7 sure that the running ones stay running and that the
8 two standby ones start up. Great.

9 The test does not verify, and I couldn't
10 find one, that verifies restart and reloading of a
11 normally running chiller after a loss of offsite power.

12 Now there are loss of offsite power tests
13 that verify that things get signals to start from
14 busload sequencers. The reason I bring this up is I
15 don't know how those chillers are designed. And that's
16 why I went back to Chapter 9.

17 I've seen a large chiller units that
18 require, it's used, there are various terms, it's
19 usually called a recycle time. You trip a chiller, you
20 can't immediately restart it, the compressor and
21 everything has to go through a recycle phase and there's
22 a time delay there.

23 Now a lot of times that recycle time is
24 built into the controls of the chiller itself that
25 wouldn't be part of the safeguard's actuation or the

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1 loss of offsite power load sequencing timers, because
2 those are just demand signals.

3 But there are many chillers I've seen that
4 you can demand it to work, but until that recycle timer
5 times out it's not going to pick up load. And there's
6 no description of the chillers in Chapter 9 of the DCD
7 that mentions anything like this.

8 So I don't know whether these have that
9 type of design feature, or whether the chillers can
10 actually load instantaneously, if they're tripped from
11 a loaded condition, you know, whenever the loss of
12 offsite power timer would pick it up.

13 I did find that they're sequenced from the
14 LOOP timer after 140 seconds and that accounts for the
15 100 second gas turbine generator. So they basically
16 get a signal to start 40 seconds after power comes back
17 to the bus, which is pretty short, because some of those
18 large chillers, I mean, they need four, five, six
19 minutes or so for this recycle time.

20 So is basically my question, in terms of
21 the system design, do they need that type of time delay
22 and if they do, where is the test to make sure that
23 indeed all of that stuff is coordinated so that it can
24 pick up load within a reasonable amount of time?

25 MR. HICKS: Yes, I don't know.

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1 CHAIRMAN STETKAR: Again, that's pretty
2 detailed. I mean, that's well below minutia.

3 MS. STEINMAN: Right.

4 CHAIRMAN STETKAR: But as I said, I was
5 going to go through these things and sort of bring
6 things out on the table.

7 MS. STEINMAN: All right. Well, we can
8 certainly --

9 CHAIRMAN STETKAR: And that's something
10 you wouldn't necessarily get in an ITAAC, because this
11 is --

12 MS. STEINMAN: Right.

13 CHAIRMAN STETKAR: -- this is pretty
14 small.

15 MS. STEINMAN: Yes, this is --

16 CHAIRMAN STETKAR: And I should have
17 brought it up when we were going through Chapter 9, but
18 I actually didn't think about it at that time.

19 MS. STEINMAN: All right. Well, I think
20 we have sufficient detail of your question that we
21 can --

22 CHAIRMAN STETKAR: Yes. Yes.

23 MS. STEINMAN: -- talk to the right
24 people --

25 CHAIRMAN STETKAR: Yes.

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1 MS. STEINMAN: -- and get back to you.

2 CHAIRMAN STETKAR: General question about
3 ventilation system tests. And there are a large number
4 of them. I did not find any missing ventilation
5 systems, so you did good in terms of covering the ones
6 that I could think about anyway.

7 But there are a large number of tests, 96
8 through, basically, 111 or so. The ventilation system
9 tests, the acceptance criteria typically say things
10 like you achieve design air flow.

11 It doesn't say that the room temperature
12 remains within acceptable limits with the equipment
13 running, as it would be under accident conditions, it
14 just says the fan achieves design airflow.

15 That presumes that whoever did the HVAC
16 system design in all of the witchcraft that goes into
17 my experience with ventilation system analyses and
18 designs must therefore be perfect.

19 It would seem that you would want to
20 measure the fact that it maintains temperature within
21 acceptable limits, rather than just measuring flow --

22 MR. HICKS: It wouldn't be able to
23 simulate design conditions because that would be --

24 CHAIRMAN STETKAR: What?

25 MR. HICKS: I mean, you wouldn't be able

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1 to simulate it --

2 CHAIRMAN STETKAR: You can't start the
3 pumps in the room and let them run?

4 MR. HICKS: Yes, normal operation
5 conditions, yes. Yes.

6 CHAIRMAN STETKAR: I mean, you won't
7 necessarily have the fluid, the fluid temperatures in
8 the suction line to a pump that would be present with
9 240 degree water in the --

10 MR. HICKS: Right.

11 CHAIRMAN STETKAR: -- RWSP, for example.
12 But you could have the motors and if it's a switch gear
13 area you could have the switch gear all loaded up. So
14 that's, in terms of -- what I'm looking for is
15 functional performance of verifying functional
16 performance of these systems, not just checking off a
17 box that, indeed, the fan was designed to put out so
18 many standard cubic feet per minute and somehow you
19 measured that. Because that doesn't tell me anything,
20 necessarily, if somebody did a calculation wrong
21 someplace.

22 MS. STEINMAN: Right.

23 CHAIRMAN STETKAR: So that's a general
24 comment for all of those HVAC tests.

25 MEMBER SCHULTZ: Or just testing the

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1 assumptions of the calculations. Right.

2 CHAIRMAN STETKAR: Or testing the
3 assumptions of the calculation. I mean, as long as
4 you're, you know, as long as you're going to start the
5 thing, you can start the thing with all of the equipment
6 running in the room and at least give yourself some
7 idea, you know, margins.

8 If you have very, very little margin with
9 cold water in the line, that would leave you to pause.
10 If you have a lot of margin, then the additional heat
11 input from perhaps some hotter suction water, or
12 something like that, probably wouldn't make too much
13 difference. So that's something to think about, you
14 know, in those acceptance criteria.

15 MR. SPRENGEL: Well, to clarify, I guess,
16 it's not a question on those specific tests, it's a
17 question of, I guess, the HVAC design, I guess, and if
18 there's any testing to verify that --

19 CHAIRMAN STETKAR: That's exactly right.

20 MR. SPRENGEL: Yes.

21 CHAIRMAN STETKAR: I mean, you know, the
22 design is based on a certain heat load in the room with
23 a certain flow rate through the ventilation unit. And
24 if it's got active cooling through some cooling coils
25 a certain heat transfer coefficient, certain

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1 temperature in the, whether it's chilled water or some
2 other fluid out there, all of that stuff is calculation.
3 So all you're doing by these test, you're just verifying
4 one parameter in that calculation which is the actual
5 flow, airflow through the ventilation unit.

6 MR. SPRENGEL: The operational parameter
7 not the evaluation of whether the --

8 CHAIRMAN STETKAR: Right.

9 MR. SPRENGEL: -- system itself is going
10 to achieve the --

11 CHAIRMAN STETKAR: Right.

12 MR. SPRENGEL: -- desired function.

13 CHAIRMAN STETKAR: Right. So yes, in
14 that sense, Ryan, it's functional verification of the
15 whole analyses. I mean, in principle, to me the design
16 specification for a fan it has to put out the design
17 the specified flow rate.

18 But in principle it could put out a lower
19 flow rate and still achieve the functional success
20 criteria to keep the room cool. Or, it could put out
21 the design flow rate and not keep the room cool if there
22 was some error, for example, in the initial
23 calculation, or an assumption.

24 MR. HICKS: Okay.

25 MS. STEINMAN: Okay, we understand. Now

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1 there is a generic statement in each one of the
2 acceptance criteria that says something akin to, you
3 know, this particular HVAC system operates as described
4 in Section 8 and 9. But all of the values that you're
5 talking about are not all clear with the delineated --

6 CHAIRMAN STETKAR: That's right. I went
7 back to a few of those places and they didn't give me
8 temperatures.

9 MS. STEINMAN: Right.

10 CHAIRMAN STETKAR: You know.

11 MS. STEINMAN: Right.

12 CHAIRMAN STETKAR: It just says that it
13 works to keep the area cool, or something like that --

14 MS. STEINMAN: Correct.

15 CHAIRMAN STETKAR: -- or something.

16 MS. STEINMAN: There are some other places
17 in the DCD where various area temperatures are
18 described, though. The EQ program and other places
19 would talk about temperatures. And, obviously, the
20 HVAC system would have to maintain those temperatures
21 for those purposes.

22 MS. STEINMAN: And so if you tie all of
23 that together you get what you want. But it's not as
24 easily --

25 CHAIRMAN STETKAR: It's not an easy way

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1 to, it's easy to say those words in this kind of oral
2 exchange, when you're looking for places to tie things
3 back into, it's a little more difficult -- the concern
4 I have, concern is too strong a word.

5 The question that I'm raising is the
6 sensitivity of the testing program to verifying the
7 function of the equipment. Because it's already been
8 mentioned that the staff will receive these test
9 programs about 60 days before the, you know, a minimum
10 of 60 days, hopefully, they'll come in earlier than
11 that, but it might be as short as 60 days.

12 People tend to look at the test programs
13 than in isolation, you know, without necessarily a much
14 broader perspective, or people thinking about oh,
15 maybe, there's some point or someplace else that would
16 pull me back into these types of success criteria for
17 the tests.

18 So that's one of the reasons why I'm trying
19 to raise that sensitivity a little bit at this stage
20 in the game. Because there are other tests where you
21 do actually verify functions.

22 I mean, you verify, for example, that you
23 cool down the reactor coolant system on RHR. It
24 doesn't say, RHR flow has to be this. It doesn't say,
25 you know, temperature, cooling water has to be this,

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1 it says I have to be able to cool it down. And that's
2 a good functional test.

3 MS. STEINMAN: Right.

4 MR. HICKS: Okay.

5 MS. STEINMAN: I understand your
6 feedback.

7 MR. HICKS: Let me make a note on this.

8 CHAIRMAN STETKAR: Here's something for
9 my own education. And this is, again, it might
10 be -- I've never loaded fuel, first fuel load in a power
11 plant, never been around the people that have done that.

12 One, excuse me, one thing I noticed for,
13 is there, it's a test, but it's actually a description
14 for the procedure for initial fuel loading. It says,
15 one of the prerequisites is water level in a reactor
16 vessel is maintained at a level approximately equal to
17 the center of the reactor of the vessel outlet nozzles.

18 Actually, during initial fuel load, you
19 actually keep level at the mid-LOOP in the hot leg,
20 you're not flooded up all the way in the refueling
21 cavity?

22 My question was, if you do that, why do you
23 do that? No, I understand, the fuel assemblies are not
24 hot, so you don't need the water for shielding, but
25 if -- we're just curious.

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1 Anybody that's been handling fuel, you get
2 ripples in the water, for example. If there's waters
3 in the vessel and only in the LOOPs when you first hit
4 it you'll get ripples and that kind of distorts your
5 visibility instead of lowering it continuously through
6 nice clear water. It's just a question, if you don't
7 have people here that was just -- I was just curious.

8 MS. STEINMAN: All right. Well, we'll
9 go --

10 CHAIRMAN STETKAR: Yes, because --

11 MS. STEINMAN: -- take that back, as well,
12 and hopefully we'll have an answer for you.

13 CHAIRMAN STETKAR: There's no question
14 about the test, it was just --

15 MS. STEINMAN: Right.

16 CHAIRMAN STETKAR: -- one of the
17 prerequisites as you read it, just not sure --

18 MS. STEINMAN: Right, what's the basis for
19 having that --

20 CHAIRMAN STETKAR: Not quite sure why that
21 would be. All right, now, I have, after this kind of
22 preliminary stuff, there are -- I went through the tests
23 for several reasons, one is to look at this issue of
24 functional verification versus just simply
25 confirmation of equipment design parameters and I

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1 mentioned a couple of tests that had questions about
2 that.

3 I also went through the tests with not only
4 the design certification and the safety analyses in
5 mind, but also the PRA in mind. And I did not see a
6 particular attempt to verify the ability of the
7 equipment or the systems to satisfy success criteria
8 that are used in the PRA.

9 In some cases they do, because the PRA
10 success criteria are, essentially, the same as the
11 design success criteria. But I'd like to explore four
12 examples that I highlighted where I'm not sure that the
13 testing program is responsive to the PRA.

14 The first one is the pressurizer safety to
15 pressurization valve pre-op test, it's Pre-op Test
16 Number 4. The pre-op test in combination with the
17 pressurizer relief tank pre-op test verifies that the
18 safety to pressurization valves open within the time
19 that's specified in the design.

20 And the acceptance criteria for the safety
21 to pressurization valves is safety to pressurization
22 valve operating time is within design specifications
23 for both SDVs and the SDV isolation valves operate in
24 accordance with the design specification.

25 Test method says that the function to

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1 provide system to pressurization is demonstrated
2 properly. And indeed I confirm over in the pressurize
3 relief tank that you verify that the pressurizer relief
4 tank condenses steam when you open the SDVs.

5 That means you actually open the safety to
6 pressurization valves and a lot of the systems are
7 boiled down, for some period of time, into the
8 pressurizer relief tank so you can verify that
9 function. And that's good.

10 The PRA takes credit for feed-and-bleed
11 cooling as an alternative to secondary heat removal.
12 And the success criteria in the PRA say that successful
13 feed-and-bleed cooling will be achieved with injection
14 flow from one safety injection pump through one open
15 safety to pressurization valve. That implies some
16 amount of flow rate through that valve with a full
17 system.

18 And I couldn't find anywhere, there's,
19 perhaps, you can infer a flow rate, if you measure the
20 rate of system to pressurization when you open the
21 valves, but I don't see anything that led me to believe
22 that you were going to do that.

23 So I was curious whether or not any of the
24 tests of the safety to pressurization valves could be
25 used to in fact confirm the success criteria that

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1 opening one and only one safety to pressurization valve
2 with injection flow from one and only safety injection
3 pump gave you enough flow, so you could remove decayed
4 heat? So essentially, measuring flow through that
5 line somehow. It might be in there someplace, but I
6 couldn't find it.

7 MS. STEINMAN: Yes, I'm actually looking
8 in the ITAAC. I mean, there is a table of ITAAC that
9 cross-reference things out of the PRA with information
10 in both Tier 1 and Tier 2.

11 CHAIRMAN STETKAR: Okay.

12 MS. STEINMAN: And this particular
13 discussion is in that table and I'm looking at the two --

14 CHAIRMAN STETKAR: Okay, good.

15 MS. STEINMAN: -- cross-references right
16 now, so give me a little bit.

17 CHAIRMAN STETKAR: What we can do, by the
18 way, Rebecca, so you're not stressed, in terms of real
19 time reactions, is let me get these items on the table,
20 because --

21 MS. STEINMAN: Okay.

22 CHAIRMAN STETKAR: -- you're much more
23 familiar with that table of ITAAC. And I will fully
24 admit that I did not go through that table line item
25 by line items.

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1 MS. STEINMAN: There's a lot of
2 information in that table.

3 CHAIRMAN STETKAR: That's, believe me,
4 you get through all of the tests summaries and by that
5 time you're pretty well maxed out, at least I was. So
6 let me get the items on the table. Maybe, through the
7 remainder, while the staff is up giving their
8 presentation and during the break, you might be able
9 to find a few things that answer some of these issues
10 rather than trying to do it, you know, in --

11 MS. STEINMAN: Real time. Yes, sure.

12 CHAIRMAN STETKAR: -- absolute real time
13 here. So that was one of them. That's actually a bit
14 of a minor one. The next one that I found in the same
15 vein, and this one is a little bit more clear cut, at
16 least as I read the testing programs.

17 If I look at the residual heat removal
18 system pre-op test, and that's Number 22, its' done
19 during hot functional testing. It says one of the
20 objectives of the test is to demonstrate residual heat
21 removal system operations during RCS cool down and
22 reactor coolant cooling by only two of four subsystems.

23 And I said, this is an example where if I
24 read through the test it's actual functional
25 demonstration. However, it's with two of the four

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1 subsystems.

2 The PRA success criteria says that I win
3 if I have only one subsystem available. And I could
4 not find a test that verified that I could remove core
5 decayed heat at the earliest time that's assume in the
6 PRA.

7 I don't know what that time is. I didn't
8 go bother to check all of the scenarios. But if I can
9 remove core decayed heat with one and only one train
10 of RHR, couldn't find it. This one clearly says that
11 it's two of four.

12 Containment fan cooler preoperational
13 test, it's Number 69, it's also known as hot functional
14 testing. And one of the acceptance criteria states
15 that containment air temperature remains below 120
16 degrees Fahrenheit during normal plant operation,
17 three units in operation, and below 150 degrees
18 Fahrenheit during simulated loss of offsite power
19 conditions, two units in operation, during hot
20 functional testing. That's good. That's another
21 case where that's a good functional test, where the fan
22 cooler is running.

23 The PRA includes credit for containment
24 and for decayed heat removal using a passive heat
25 removal function from the containment fan coolers where

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1 the fan's not running, cooling water aligned to the fans
2 through an alternate alignment and only passive heat
3 removal by heat transfer through the cooling coils.

4 And the success criteria used in the PRA
5 says I can remove core and containment decay heat with
6 two and only two of the fan cooler coils operating in
7 that mode.

8 That's really important for the PRA,
9 because in the PRA that is the final way that I can
10 remove core decay heat. And believe me, numerically,
11 it buys you quite a bit in the PRA. Didn't find any
12 testing to verify that heat removal mode.

13 Now, obviously, you can't heat up the
14 containment to the conditions, but you could verify
15 heat transfer through those coils with a component
16 cooling water system aligned without the fans running.
17 Didn't find that.

18 And finally in this PRA bucket, this will
19 be a joint question for Luminant, so I'll give them a
20 heads up that they can start thinking about it.
21 Ultimate heat sync rejection capability test. It's up
22 in the power ascension testing, so it's 14.2.12.2.4.21,
23 different section of the DCD, and that's okay.

24 The acceptance criteria for that test note
25 that heat rejection capability of two operating and

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1 four operating ESWS, essential service water system
2 trains are verified.

3 Again, the PRA takes credit for one and
4 only train to remove core decay heat and I didn't find
5 any test that looks at heat removal capabilities with
6 only one train running.

7 That's also obviously linked all the way
8 out to the RHR system, you know, through components all
9 the way out, no single train heat removal capability.

10 So those were the four that I had for the
11 PRA sort of related success criteria verification. If
12 there are, if there are pointers in the ITAAC tables
13 that would be great.

14 MS. STEINMAN: Okay.

15 CHAIRMAN STETKAR: Because I didn't look
16 at those. I think, without boring people, the
17 remaining ones that I had are real minutia, so I'll skip
18 those.

19 Before we do get into ITAAC, did any of the
20 other Members have any questions about the pre-op
21 tests, or the hot functional tests, or the startup
22 tests, or anything that are not specifically ITAAC?
23 They're obviously interrelated, but I'm learning that
24 they might not be as clearly interrelated, as I thought
25 they were. Nothing?

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1 MEMBER BROWN: I actually had one that I'm
2 not so sure on thinking about it that it was going to
3 be, this is more of a calibration, because of the high
4 leveled nature of the things cited.

5 I was looking at the RTD thermocouple and
6 cross-calibration with the, you know, the
7 cross-calibration test, which is 14.2.12.1.19. Don't
8 worry about the number.

9 But it just says, effectively, you know,
10 check these things against the average reactor coolant
11 temperatures, but it gives no idea of what level of
12 instrumentation you may need to verify that you've got
13 satisfactory data.

14 In other words, how accurate is it, or
15 whatever, who determines, once they run this test that
16 they have instrumentation that provides calibration
17 information that's valid against accident analyses, so
18 that they've got that coordinated properly?

19 Some of it's not covered in the DCD, it's
20 not covered in the verification and it was not in the
21 Tier 1 information, anywhere that I could find. It
22 was --

23 MR. HICKS: I'm not quite sure I
24 understand that question.

25 MEMBER BROWN: Okay. The preoperational

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1 test says you're going to go cross-calibrate these
2 things to make sure they agree.

3 MR. HICKS: Okay.

4 MEMBER BROWN: You got to have some
5 reference calibration device --

6 MR. HICKS: That's instrument, you mean?

7 MEMBER BROWN: Yes, that's
8 instrumentation, whatever it is, that is sufficiently
9 accurate that you're not outside the bounds that you
10 know you're close enough. In other words, if I do this
11 with an instrument that's five degrees, plus or minus,
12 then that's not very good. If I do it --

13 MR. HICKS: Okay.

14 MEMBER BROWN: That's what I'm talking
15 about. In other words, how do they, specific, make
16 sure that they're using the proper instrumentation --

17 MR. HICKS: I'm not sure that that level
18 of detail would normally be in the test description,
19 it would be more in the, you know --

20 MS. STEINMAN: Procedures.

21 MR. HICKS: Yes, in the procedure
22 development for the tests. And --

23 MEMBER BROWN: I guess my point is, if it's
24 that far down the line that sounds like it's an
25 applicant issue, licensee issue. So who makes sure he

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1 does that properly?

2 Is that up to the NRC staff guys that are
3 regional overseers, or does MHI step away from that and
4 let that just be done on these hearing basis? That
5 seemed to be consistent throughout all the pre-op tests
6 that I ran, that seemed to be pretty consistent with
7 all of them.

8 MR. HICKS: Well MHI writes the tests.

9 MEMBER BROWN: The specific procedure --

10 MR. HICKS: MHI writes the tests --

11 MEMBER BROWN: Right.

12 MR. HICKS: -- but the applicants would
13 implement the tests, but they're, you know, they're
14 written by MHI. The vendor, the reactor vendor would
15 write the startup test, that's the --

16 MEMBER BROWN: And you've done the action
17 analysis? Well that's why I run the --

18 MR. HICKS: MHI has done the action --

19 MEMBER BROWN: Okay, that's what I kind of
20 expected there would be something in here that would
21 say hey, that would have described the instrumentation
22 in the Chapter 14, to ensure that when you, eventually,
23 five years from now, start writing those that you have
24 some idea of what level, what accuracy resolution of
25 the instrumentation that you're using to perform that

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1 calibration check itself.

2 MR. HICKS: We can --

3 MEMBER BROWN: I mean, ITD and
4 thermocouples are their own things, but that's --

5 MR. HICKS: Right.

6 MEMBER BROWN: -- that's a different
7 issue, I mean, you're specifying those, but now you need
8 specific test instrumentation to make sure you've got
9 the right cross-calibration.

10 That was the only --

11 MR. HICKS: Yes, and --

12 MEMBER BROWN: -- one I could --

13 MR. HICKS: -- the thing that would drive
14 it, you know, would be the QA program for testing
15 equipment, you know, that piece of the QA program, which
16 defines how you do testing and test equipment would
17 presumably provide the level of quality that you would
18 have with that test instrument. But we'll have to --

19 (Simultaneous speaking.)

20 MS. STEINMAN: I mean, what's in the BCB
21 is basically an abstract of the test procedure.

22 MR. HICKS: I would suggest --

23 MEMBER BROWN: I would say very much,
24 okay, and therefore, it's left up to whoever does this
25 five years from now at MHI, or MNES, or whoever. And

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1 that just seems counter -- that's based on my past
2 experience, that there's nobody making sure that it's
3 consistent with what was necessary, it doesn't, it's
4 not obvious. I'm not saying you won't, I'm just saying
5 it's not obvious, to me, how that gets --

6 MR. HICKS: Yes. Well, all the testing
7 procedures are developed with the vendor's input or
8 they actually write them. And I think the description
9 of that program is in Chapter 14 of the administrative,
10 how those procedures are all developed and reviewed by
11 the vendor and the applicant and everybody. And that
12 process is described but not the specific thing that
13 you're talking about.

14 MEMBER BROWN: Okay. Well you answered
15 my question, I guess. Not there.

16 MR. HICKS: It's not there. It's not in
17 the DCD.

18 MEMBER BROWN: It's not in the DCD, yes.

19 MR. HICKS: No, it's not.

20 MEMBER BROWN: Okay. And there's no
21 topical report that I saw that looked like it was
22 referenced in that either, so I mean, it's just, I only
23 did a very quick scan of a, a quick summary in terms
24 of references.

25 MS. STEINMAN: Yes, not the level of

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1 detail that you were discussing.

2 MEMBER BROWN: I didn't think it would be,
3 based on the one -- here.

4 MS. STEINMAN: Yes, there is no topical
5 report, or technical report with the detail you were
6 discussing.

7 MEMBER BROWN: Okay. I have one other
8 question, I'm not sure this is the right place. During
9 our subcommittee meeting we talked about control of
10 access.

11 It was the communication one way
12 communication from the unit bus to the station bus and
13 you all included some --- there's some changes to the
14 DCD and to the T01 information, to specify how that's
15 going to be done with the data diode hardware-based
16 analog type, as opposed to 128 gigabit fancy
17 algorithms, I'm being facetious with that, the last
18 part of it, but types of security algorithms.

19 But I didn't see and I went back to look
20 at that information that you provided to us, which is
21 not in any of the revisions we have yet, or at least
22 not that I've received.

23 And I would have expected to see some type
24 of a test shown up. And when I went back and looked
25 at the information you showed that you gave us as how

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1 you're going to resolve that from the Subcommittee,
2 which was all fine, I did not see a test incorporated
3 into the verification stuff in that documentation that
4 you gave us.

5 You mentioned something in 13.3 Chapter 9,
6 Chapter 7, and DCD, there was a Section 2.5 Tier 1
7 2.5.6.1, or whatever, but if you went through all that,
8 and I went back and reviewed every one of those again
9 and I did not find any reference to a test.

10 So I would have thought that would have
11 been just one thing you did. Now whether that's an
12 ITAAC, or whether it's a pre-op I, personally, if it
13 was me, I would have had to be, an ITAAC as well, to
14 make sure it hasn't been compromised periodically, or
15 whatever you call that test you have, where it's done
16 periodically in the plant, but --

17 MR. HICKS: Do you know which question
18 he's talking about, the previous question?

19 (Simultaneous speaking.)

20 MS. STEINMAN: Yes, it's a Chapter 7 RAI
21 that was recently submitted, I believe.

22 MEMBER BROWN: It was good until us, not
23 as I'm -- I don't remember it being an RAI --

24 MS. STEINMAN: RAI, okay.

25 MEMBER BROWN: -- but it was a

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1 supplemental, answers to ACRS Member questions --

2 MS. STEINMAN: Okay.

3 MEMBER BROWN: -- with attachments. And
4 that's the information, but it was not in -- it was
5 documented in the safety evaluation for Chapter 14,
6 where they went through the whole list of every section
7 that you were going to be doing.

8 So I went back and walked through, and I
9 checked it again and yes, they got them all and all the
10 things there, but I did not see anything that
11 incorporated a test of any kind.

12 MS. STEINMAN: Certainly, the version of
13 the DCD that you have was submitted prior to you having
14 received the information from Chapter 7, so if there
15 was a change -- it would not be in --

16 MEMBER BROWN: No, I understand that.

17 MS. STEINMAN: -- the DCD.

18 MEMBER BROWN: I understand that.

19 MS. STEINMAN: Okay.

20 MEMBER BROWN: But nobody, I would have
21 thought that in the information that you gave us --

22 MS. STEINMAN: Gave us it would have
23 indicated --

24 MEMBER BROWN: -- would resolve that,
25 which you said you were committing to put in the DCD,

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1 covered the waterfront, you know, all the areas,
2 Chapter 7, the Tier 1 stuff, Chapter 9, Chapter 13,
3 there was nothing in Chapter 14.

4 MS. STEINMAN: Right.

5 CHAIRMAN STETKAR: In some sense, this is,
6 you know, theoretically, all of the, I'll call them
7 loose ends, but the dangling things --

8 MEMBER BROWN: Yes.

9 CHAIRMAN STETKAR: -- that we're bringing
10 up will be tied together by the time the final SER is --

11 MEMBER BROWN: That's why I'm bring it up.

12 MS. STEINMAN: Absolutely. Absolutely.

13 MEMBER BROWN: I'm just bringing it up
14 because that was a loose end that was not there when
15 you gave it. Because you were very thorough when you
16 said you were going to incorporate our request.

17 MS. STEINMAN: Right.

18 MEMBER BROWN: And I thought you -- but I
19 did not think of looking in Chapter 14.

20 MS. STEINMAN: Chapter 14, all right. So
21 I'm not familiar with that --

22 MEMBER BROWN: I didn't think of Chapter
23 14.

24 MS. STEINMAN: I'm not familiar with that
25 particular response, but I can definitely look at it

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1 and I understand your point of the disconnect of all
2 of this information and it doesn't appear that we added
3 the test --

4 CHAIRMAN STETKAR: Added a test.

5 MS. STEINMAN: -- to verify the --

6 MEMBER BROWN: And should it be an ITAAC,
7 or should it just be a pre-op test that's done once in
8 the, right off the plant, or what have you? Those are
9 the two questions that come out is, where's the test,
10 is there going to be one, and ITAAC or pre-op? That's
11 fundamentally it.

12 All right, that was all I had, John.

13 MS. STEINMAN: Okay.

14 CHAIRMAN STETKAR: Anybody else? And we
15 thought this was going to be easy.

16 MS. STEINMAN: So are we ready to delve
17 into ITAAC at this point? Yes, I have the same
18 excitement. So Section 14.3 provides the bases,
19 processes and selection criteria used to develop the
20 Tier 1 information.

21 The emphasis in Chapter 14 is on describing
22 the level of detail to be provided in the Tier 1
23 material. This slide provides a basic overview of
24 various sections of Chapter 14.3 and the fact that
25 Section 14.3.1 provides introductory information, such

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1 as definitions of key terms that are used in the Tier
2 1 material.

3 The following section provides an overview
4 of Tier 1, Chapter 1, which is in Chapter 1 of Tier 1
5 is the introduction of Tier 1. And then the next
6 section describes how the design descriptions and the
7 ITAAC are going to be presented in Tier 1 Chapter 2.

8 And then the next section, which is 14.3.4
9 describes a selection criteria that are used to develop
10 the ITAAC. Following that, 14.3.5 discusses the
11 interface requirements and how those are presented in
12 Tier 1 Chapter 3.

13 And then, finally, the last section of 14.3
14 provides references that are cited in the text. So as
15 you know Tier 1 information is information that's going
16 to be certified by the NRC, as part of its approval of
17 the US-APWR standard design.

18 As I mentioned on the previous slide, Tier
19 1 material is into three chapters, Chapter 1 being the
20 introduction, Chapter 2 being the design descriptions
21 and the subsequent ITAAC that go with verification of
22 the design and Chapter 3 is the interface requirements.

23 The type and level of information to be
24 included in Tier 1 is based on a graded approach
25 commensurate with the safety significance of the

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1 associated SSC.

2 The Tier 1 material is intended to be
3 developed in accordance with Reg Guide 1.206, a
4 NUREG-0800, which is SRP 14.3 specifically in this
5 area. Additional details regarding the information
6 provided in each of the three chapters of Tier 1 will
7 be provided in the next couple of slides, so let's go
8 ahead and get started with that.

9 So Chapter 1 is the introduction and all
10 of the information provided in Chapter 1 is selected
11 to help assure clarity and understanding of the rest
12 of the material that's included in the technical
13 aspects of chapters of Tier 1.

14 The following types of information are
15 included in Chapter 1, including definitions of key
16 terms used throughout the document, general
17 provisions, such as an explanation of how the ITAAC are
18 presented and how figures are used in conjunction with
19 the design descriptions in the ITAAC and the legend
20 identifying the meanings of the various symbols that
21 are used in the Tier 1 figures.

22 One important thing to note out is that the
23 TAG numbers that are included in the figures and tables
24 in Tier 1 are not actually considered part of the Tier
25 1 material.

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1 Tier 1 Chapter 2 describes the scope of the
2 certified design through the use of design descriptions
3 and the related ITAAC. The Tier 1 design descriptions
4 summarize technical information that is expressed in
5 a narrative form and supplemented with different tables
6 and figures.

7 This information is drawn from the
8 appropriate Tier 2 chapter descriptions, but it does
9 not include all the detail that is in Tier 2, it's
10 purposely high level information that's pulled into
11 Tier 1.

12 As shown on this slide and the next, the
13 various subsections of this chapter, organized in the
14 same manner as SRP 14.3 in order to facilitate staff
15 review of the material.

16 And these are the typical areas that we'd
17 expect, such as site parameters, structural and systems
18 engineering, typing and systems components, reactor
19 systems, instrumentation and controls, electrical
20 systems, plant systems, radiation protection, human
21 factors engineering, emergency planning, containment
22 systems and physical security hardware.

23 And so in that you saw the two sections that
24 were excluded from the socioeconomic at this point,
25 which was the section associated with structural

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1 systems engineering and the section with human factors
2 engineering.

3 Chapter 2 of Tier 1 also addresses two
4 other matters that are not covered by Sections SRP 14.3.
5 Section 2.13 addresses design reliability assurance
6 program and Section 2.14 addresses the initial test
7 program.

8 The SRP sections upon which the
9 information in each one of these Tier 1 sections is
10 described in DCD Section 14.3.4.13 and 14.3.4.14,
11 respectively.

12 Tier 1 Chapter 3 describes the interface
13 requirements with site-specific systems. The focus is
14 on the safety significant design attributes and
15 performance characteristics that are necessary to
16 ensure that the site-specific portion of the design is
17 in conformance with the certified design.

18 For the US-APWR, Tier 1 Chapter 3 defines
19 interface requirements for the ultimate heat sync, the
20 fire protection system, the essential service water
21 system and the electrical system.

22 So now that we've gone over the general
23 layout of Tier 1, let's briefly talk about the criteria
24 for selecting what material belongs in Tier 1. All of
25 the features or functions necessary to satisfy

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1 regulations are to be included in Tier 1.

2 As I noted previously, the type of
3 information and the level of detail included in Tier
4 1 is based on a graded approach commiserate with the
5 safety significance of the particular SSC. Both
6 safety-related to SSCs and severe accident design
7 features are included in Tier 1.

8 Top level requirements, such as principle
9 performance characteristics and safety functions, are
10 selected based on risk insights regarding the safety
11 significance of the SSC, their importance and the
12 safety analysis and the functions, with respect to the
13 defense and depth considerations.

14 Non-safety-related SSCs are evaluated on
15 a case by case basis to ascertain if the level of detail
16 considered is appropriate to be included in Tier 1,
17 based on their safety significance, as well.

18 Design specific in any creatures of the
19 facility are also included in Tier 1, as appropriate.
20 So in our previous conversation when we were talking
21 about the accumulator, there is information about the
22 accumulator in Tier 1 and several ITAACs associated
23 with that.

24 So DCD Table 14.3-1a through f, which are
25 summarized here on this slide, provide information

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1 particularly significant to the top level requirements
2 for Tier 1.

3 These tables cross-reference the
4 important design information and parameters used in key
5 safety and integrated plant safety analysis to their
6 treatment in Tier 1.

7 And so when you look at this table, there's
8 basically relevant Tier 2 sections, chapters, tables,
9 et cetera, relevant Tier 1 information, ITAAC that are
10 relevant that go with each description.

11 And then it also cross-references to the
12 relevant information in the PRA, or in Section 19.2 for
13 severe accident information. So these are a good
14 summary place for finding cross-references throughout
15 the DCD.

16 Our key design features are derived from
17 appropriate Tier 2 chapters, such as Chapters 2 through
18 10, 15, 16 and 19. However, these tables are intended
19 to provide cross-references so their focus is on design
20 features and not on programmatic or operational
21 aspects.

22 So information about system lineup during
23 normal operation, or maintenance, or those types of
24 things, are excluded completely from the table. So
25 this is, basically, just a design feature

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1 cross-reference in this aspect.

2 MEMBER REMPE: I had a couple questions
3 about information in Table 14.3-1d. And some of it may
4 be that I've forgotten or missed things in earlier
5 discussions we've had.

6 But, for example, it talks about in the
7 event of a loss of heat removal by a RHR and SSCs so
8 that an SI pump can be manually started to maintain RCS
9 water level. And what I can't remember is, how are you
10 measuring water level in the RCS, what sensors are used?

11 And then, I was puzzled on how you
12 determine adequacy, so if you could give us a little
13 more information on that, I'd appreciate it. And
14 again, if it's hard to come up with that on the spot,
15 I've got some other questions that we could discuss
16 later.

17 MR. HICKS: Okay. The level instruments,
18 I mean, those are the same level instruments they use
19 like when they're doing mid-LOOP operations --

20 (Simultaneous speaking.)

21 MEMBER REMPE: You said a DP cell, what is
22 it?

23 MR. NISHIO: We have the RCS leveler,
24 leveler measurement, it's in the range of the lowest
25 level is bottom of the main coolant pump, the main

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1 coolant LOOP. We can B- we can measure the main coolant
2 LOOP.

3 MEMBER REMPE: So what is the type of
4 sensor?

5 MR. NISHIO: The transmitter.

6 MEMBER REMPE: A what? I'm sorry, I
7 couldn't --

8 MR. NISHIO: Displacement.

9 MEMBER REMPE: Is it like a DP cell?

10 MR. HICKS: Yes it is.

11 MEMBER REMPE: Okay.

12 MR. NISHIO: Yes, ma'am.

13 MEMBER REMPE: Okay. Then also I was
14 interested in an item that's referenced as 2.4.5.1 for
15 providing water to flood the reactor cavity. I'm aware
16 of another design of -- there's some discussion on
17 what's the trigger for starting to flood the reactor
18 cavity, is it the core exit temperature, for example?
19 And I actually on this one did a little bit more homework
20 and went into Chapter 19.

21 And the other question I had was, you know,
22 how do you determine it's adequate there that you've
23 flooded the reactor cavity in time? And, of course,
24 in Chapter 19 you talk about that when you want to flood,
25 before core relocation occurs to the lower head.

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1 And there was some map analyses done and
2 at that point I stopped pulling the string. How many
3 map analyses, what's scenarios did you look at, and how
4 did you determine that you have indeed flooded the
5 cavity and gotten up to enough height that you can
6 ensure the vessel doesn't fail for enough scenarios?
7 And so if I could have a little more information on that
8 I'd appreciate it.

9 MR. HICKS: Which line item in the table,
10 this is table 1d, again?

11 MEMBER REMPE: Yes, 3-1d. Again, there
12 are so many items listed for Tier 1 reference 2.4.5.1,
13 so the easiest way I can find is to do a search for flood
14 the reactor cavity electronically, you know, because
15 they also had the same Tier 2 location Table 19.1-119,
16 so that's not a good searching thing.

17 MEMBER BROWN: Is that a PDF at Page 255?

18 MR. HICKS: It is.

19 MEMBER REMPE: Okay. But anyway, at this
20 second, I will actually send a different line on yours
21 so that -- anyway, I was just kind of curious about some
22 more information because I am aware of some discussions
23 that occurred with another design that was trying to
24 flood the cavity and how to justify they had done it
25 in time. And I didn't see that level of discussion in

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1 Chapter 19 for you guys.

2 MR. HICKS: Yes, I can't find what you're
3 looking for, so it's hard for me --

4 MEMBER BROWN: The one that starts in high
5 RCS pressure, is that the one you're talking about?

6 MEMBER REMPE: No, CSS/RHRS provides
7 water level to flood the reactor cavity.

8 MEMBER BROWN: Okay. I see an earlier one
9 you were talking about.

10 How do they trigger the CSS --

11 MEMBER REMPE: Yes, I want to know what,
12 again, it's a manual thing, I believe, from what I read
13 in Chapter 19. And that's another -- is it automatic --

14 MEMBER BROWN: Still on Page 55?

15 MEMBER REMPE: -- or is it manual and just,
16 you know, some of the assumptions used to justify you've
17 done it in time, if you're going to take credit for that.

18 MR. HICKS: Okay.

19 MEMBER BROWN: It happens to be the bottom
20 one on my page, 255.

21 MS. STEINMAN: That's not the one she's
22 talking about, no.

23 MEMBER BROWN: Okay.

24 MEMBER REMPE: Did you find it okay? I
25 can --

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1 MR. HICKS: I found one of them, but I
2 don't this is --

3 MEMBER REMPE: This is about --

4 MEMBER BROWN: It should start CSS/RHRS.

5 MR. HICKS: And this is the one you're
6 talking about, right, for the reactor cavity?

7 MEMBER REMPE: Yes, those are two of them,
8 but, yes.

9 MS. STEINMAN: We found it.

10 MR. HICKS: Okay.

11 MS. STEINMAN: Okay.

12 MEMBER REMPE: Thank you.

13 MR. HICKS: Okay, I see it. And your
14 question is, how do you --

15 MEMBER REMPE: What's the trigger, is it
16 core exit temperature? Or what -- how do you know,
17 what's the trigger --

18 MR. HICKS: Yes.

19 MEMBER REMPE: -- for the signal and then
20 is it manual on, I think it's manual from what I read
21 in Chapter 19, but then how do you determine adequacy?
22 And, again, in Chapter 19 some map calculations were
23 done.

24 MS. STEINMAN: Right.

25 MEMBER REMPE: But I quit pulling the

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1 string at that point. How do you map calculations,
2 because you want to try and flood before you have core
3 relocation to occur --

4 MS. STEINMAN: Correct.

5 MEMBER REMPE: -- to prevent vessel
6 failure. And so just some additional details --

7 MS. STEINMAN: Right.

8 MEMBER REMPE: -- based on that
9 discussion.

10 MS. STEINMAN: So you're looking for how
11 many different scenarios we looked at, how we bounded
12 them, how we determined the --

13 MEMBER REMPE: How do you know you've done
14 it in time?

15 MS. STEINMAN: Right.

16 MEMBER REMPE: Yes.

17 MS. STEINMAN: Okay.

18 MEMBER REMPE: Thanks.

19 MS. STEINMAN: All right, we'll be getting
20 back to you on that.

21 MEMBER REMPE: Thanks.

22 CHAIRMAN STETKAR: Any more questions on
23 this slide?

24 All right.

25 MS. STEINMAN: All right so our next topic

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1 is DAC. Design acceptance criteria for the US-APWR are
2 used for the piping system and component design. As
3 of DCD Rev 4, this is the only area in which Mitsubishi
4 has accepted DAC.

5 But we recognize that additional DAC may
6 result from some of the remaining areas principally
7 maybe HFE could result in some additional DAC. And
8 we'll just go through the review process and see where
9 that leads at this point.

10 But that closure process is described in
11 Appendix 14b of the DCD and the COL applicant is
12 responsible for providing that that closure schedule
13 and whether the standard approach described in the DCD
14 Appendix 14b would be used for closure of the DAC, or
15 not.

16 The next slide just outlines the closure
17 process. And I believe that this is a pretty standard
18 closure process where you can have three options to
19 close DAC ITAAC.

20 And those could be closure through
21 amendment of the design certification rule, closure
22 through the COL review process, where the COL
23 application contains the required design and analysis
24 information in order to close DAC ITAAC, or closure
25 after COL issuance, where the NRC issues the COL with

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1 the DAC ITAAC open and then it's inspected to close it
2 as part of the construction inspection process.

3 So those are the three possible ways to
4 close DAC that are currently outlined in the DCD. So
5 that covers kind of the technical overview of the ITAAC
6 section of 14.3.

7 There was one open item that was identified
8 in the Chapter 14 SE, for 14.3, and it's currently the
9 only one. And it is related to the operational VDUs
10 and is tied to a particular REI, which is 992-6999, it's
11 a Chapter 7 question.

12 That particular question that the open
13 item was tied to was closed by a follow-up question and
14 just last week MHI provided their response to that
15 follow-up question. And so the staff will need time
16 to review that to determine if it will close the open
17 item, or not.

18 As a side note, you may have also noticed
19 that there were a lot of confirmatory items in Chapter
20 14's SE and the staff has been working really hard with
21 us, as part of DCD Rev 4 review to close out many of
22 those items in a significant number of those have been
23 able to be closed out in just recent months.

24 And so in terms of what was opened in the
25 SE, we're working very hard to close a lot of those items

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1 out. So in summary, the US-APWR verification programs
2 conform to the regulatory requirements for the ITP it's
3 Reg Guide 1.68 Revision 3 and any exceptions that we
4 have taken are noted in Appendix 14a.

5 And for the ITAAC, we conform with Reg
6 Guide 1.206 and NUREG-0800 Section 14.3. And then,
7 currently, the only DAC that exists are for the piping
8 design area. And that concludes our presentation.

9 CHAIRMAN STETKAR: Great. Any of the
10 Members have any other questions for MHI?

11 MEMBER BLEY: When you went through that
12 you said you don't anticipate other DAC and then you
13 hesitated a little bit.

14 MS. STEINMAN: Yes.

15 MEMBER BLEY: But there are some areas
16 where you're --

17 MS. STEINMAN: I think HFE is probably the
18 only area that we anticipate that it might -- we had
19 a process where we redid several of our technical
20 reports to address many of the staff's concerns and we
21 hoped that that would eliminate some items that a year
22 or two ago when we were talking about might have been
23 DAC.

24 And so our intention is to have as few or
25 none, but there's no guarantees that that's going to

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1 happen until after the staff's had a chance to review
2 that new material.

3 MEMBER BLEY: Fair enough.

4 CHAIRMAN STETKAR: Anything else for MHI?
5 If not, thank you. If by the end of the day if you have
6 any pertinent feedback on any of the items we raised
7 that's fine, if you don't, I'm sure you'll get back with
8 us also, that's --

9 MS. STEINMAN: I will definitely get back
10 to you as soon as we can.

11 CHAIRMAN STETKAR: You're really good
12 about doing that, thank you. And thanks very much.
13 We'll have the staff come up and what I'd like to do
14 is go through the staff's presentation on DCD Chapter
15 14 then we'll take a break. We're running a little
16 behind schedule, but we have --

17 MEMBER BROWN: Little?

18 CHAIRMAN STETKAR: -- ample, we have ample
19 time this afternoon.

20 MEMBER BROWN: I was just commenting on
21 the use of your adjective, little.

22 CHAIRMAN STETKAR: Little, in geologic
23 time, it's really a fly speck in history. So I'll have
24 the staff come up and go through Chapter 14 for the DCD.

25 MR. OTTO: Good afternoon. My name is

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1 Ngola Otto and I'm the Project Manager for the US-APWR
2 Design Certification. And thank you for the
3 opportunity again to present Chapter 14 today. With
4 me here is Khoi Nguyen, he's with the I&C Branch, he's
5 one of the reviewers for the I&C Branch.

6 The few slides is just a list of the staff
7 members who did a review for Chapter 14 and there's also
8 a lot of other coordination with them, I mean, other
9 staff members from other chapters, but these are the
10 folks who did the review and provided input to the
11 safety evaluation.

12 The review is very brief, we just have one
13 open item in Section 14.3.5. And as MHI have
14 mentioned, Sections 14.3.2 will be presented at the
15 same time with Section 3.7 and 3.8 and Sections 14.3.9,
16 which will be presented at the same time with HFE, which
17 is Chapter 18.

18 And the one open item, which image I have
19 already covered, is related to RAI 7638, Question 27,
20 we issued a follow-up RAI to the one discussed in the
21 safety evaluation, where we're looking for a
22 satisfactory ITAAC to verify that the as-built
23 protection and control system are separate and that any
24 failure in any control system will not impact the
25 performance of the safety system.

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1 And the status currently produced for this
2 item is we did not receive a response from MHI and staff
3 is currently reviewing that response. So that's the
4 status of the one open item. So there's a number of
5 staff members here from different sections who are
6 available for any questions that you may have on ITAAC,
7 or ITP.

8 MEMBER BLEY: What is, just, I know you
9 haven't reviewed it yet, but is that, can you tell us,
10 is that response just an explanation, or does it include
11 some change in the -- for the requirements.

12 MR. NGUYEN: Yes, I can.

13 (Simultaneous speaking.)

14 MR. NGUYEN: -- last week for the
15 follow-up RAI response.

16 MEMBER BLEY: Yes.

17 MR. NGUYEN: We having to go through the
18 whole, because it's like 30 pages, RAI response, but
19 we briefly went through it and we saw they provide -- the
20 staff requested, I don't know is submit the, satisfy
21 what the staff requested or not yet, but visually they,
22 I think they provide what the staff requested and we
23 had to go through the --

24 MEMBER BLEY: Okay.

25 MR. NGUYEN: -- review.

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1 (Simultaneous speaking.)

2 MEMBER BLEY: Good. Thanks.

3 MEMBER SCHULTZ: So it appears to be
4 responsive --

5 MR. NGUYEN: Yes.

6 MEMBER SCHULTZ: -- to the particular
7 areas of concern that were --

8 MR. NGUYEN: Right.

9 MEMBER SCHULTZ: -- related in the request
10 to --

11 (Simultaneous speaking.)

12 MR. NGUYEN: I can go through, briefly,
13 what happening for that RAI. Originally the staff
14 request the MHI to provide the list of the communication
15 data, communication fault.

16 And the initial response MHI provide the
17 appendix to the technical report, which lists all the
18 normal and abnormal communication faults. And also
19 the staff request an ITAAC in Tier 1 to verify those
20 normal and abnormal communication faults.

21 MEMBER BLEY: An additional ITAAC?

22 MR. NGUYEN: Additional ITAAC. And in
23 the initial response that ITAAC is not specified by not
24 providing the acceptance criteria and what test to be
25 performed to verify that. So the staff closed that RAI

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1 and issued the follow-up RAI to get the appropriate
2 ITAAC in the Tier 1 and that's what the MHI has
3 submitted --

4 MEMBER BLEY: Okay.

5 MR. NGUYEN: -- last week and the staff
6 have to review that.

7 MEMBER BLEY: Okay.

8 CHAIRMAN STETKAR: I had one question when
9 I was going through the SER. You heard what I asked
10 MHI about the PRA functional criteria, so I won't repeat
11 that. But I had a different one.

12 In Section 14.2.7.4, there was a statement
13 that says with regard to Reg Guide 1.20 comprehensive
14 vibration assessment program for reactor internals
15 during preoperational and initial startup testing.

16 I'll just keep going into it. The DCD
17 takes one exception, mainly the measurement for startup
18 test for steam generator internals is not planned.
19 This is acceptable.

20 And there's a section that provides a
21 little bit more elaboration, but basically says that
22 they're not going to do any vibration measurements on
23 the steam generators, tubes, and things like that.

24 My question is, basically, why is the staff
25 comfortable with that? How do these steam generators

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1 differ from other steam generators, or how are they
2 similar enough that it doesn't warrant at least
3 first-of-a-kind vibration measurements? You require
4 them to do reactor vessel internal vibration
5 measurements for first-of-a-kind, but not steam
6 generator to vibration.

7 MR. OTTO: Is there any member of the staff
8 who can address that question? That's for Section
9 14.2.2.

10 CHAIRMAN STETKAR: And just for the
11 record, I'm not asking this because the applicant
12 happens to be Mitsubishi, I would have asked this if
13 it was any vendor.

14 MR. OTTO: Okay.

15 MR. BUCKBERG: If nobody's present from
16 the staff, this is Perry Buckberg, we'll just have to
17 take this for action.

18 CHAIRMAN STETKAR: Okay, take it back. I
19 appreciate some feedback, because I didn't see anything
20 in the SER that gave me assurance that because these
21 steam generators are essentially identical to steam
22 generators that we have tons of operating experience
23 at various power levels and different configurations
24 to justify why that wouldn't at least be required for
25 the first plant.

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1 MR. OTTO: Okay.

2 MEMBER SCHULTZ: And I agree with John,
3 this is not anything that would be vendor specific, it's
4 based upon lessons learned. It seems like it would be
5 the right direction to go in the future.

6 MR. OTTO: Yes, we'll take it back. Thank
7 you.

8 CHAIRMAN STETKAR: Do any of the other
9 Members have any questions for the staff? If not,
10 thank you very much, that was efficient. And what I
11 think we'll do is, because I'm not going to let Luminant
12 off the hook, as quickly as they think they're going
13 to get left off the hook, we'll take a break now and
14 we'll reconvene at 2:55 p.m.

15 MR. OTTO: Okay, thank you.

16 (Whereupon, the foregoing matter went off
17 the record at 2:38 p.m. and went back on the record at
18 2:57 p.m.)

19 CHAIRMAN STETKAR: We are back on the
20 record. And for the record, apparently the staff has
21 an answer to my question about the steam generator
22 vibration testing, so what I'd like to do is have them
23 respond before we start the presentation from Luminant
24 on the COLA.

25 MR. WONG: This is Yuken Wong from

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1 Mechanical Engineering Branch. Earlier there's a
2 question on why there's no vibration testings for the
3 steam generators for the vibration analysis testing
4 section as Section 3.9.2 is still not complete. The
5 staff is still evaluating the vibration analysis
6 testing for the steam generator internals.

7 CHAIRMAN STETKAR: Okay. Make sure I
8 understand that. You're saying that the staff's
9 review of that section of the DCD is not yet complete?

10 MR. WONG: Correct.

11 CHAIRMAN STETKAR: Okay.

12 MR. WONG: Okay.

13 CHAIRMAN STETKAR: Okay.

14 MEMBER BROWN: Well, just a minute,
15 there's still, they didn't finish the review of the
16 analysis, you also used the word, testing, is there a
17 proposed test in the stuff that you're reviewing or --

18 MR. WONG: Currently, in the DCD there's
19 no proposal to perform the vibration testing for the
20 steam generator internals.

21 CHAIRMAN STETKAR: Well, what I mean --

22 MEMBER BROWN: That's why --

23 (Simultaneous speaking.)

24 CHAIRMAN STETKAR: -- essentially, if I go
25 back to the SER, and let me make sure that we're on the

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1 same page, the SER for Chapter 14 has concluded that
2 it is acceptable that no testing of the steam generator
3 internals be performed.

4 You weren't here, so I'll read the quote.
5 With regard to Section 1.20, and I won't read the title
6 of the Reg Guide again, the DCD takes one exception,
7 namely the measurement at startup test for steam
8 generator internals is not planned. This is
9 acceptable. That's from the SER.

10 So you, my interpretation is, in the safety
11 evaluation for Chapter 14, you have accepted the notion
12 that they will not perform vibration testing. And yet,
13 from what you just said, it sounded like there wasn't
14 yet a conclusion about that testing.

15 MR. WONG: Because this is an open event
16 and because I am newly emerging, the staff for the
17 review of Section 3.9.2 dynamic testing and analysis
18 issue RAIs regarding to the steam generators vibration
19 analysis -- I want to go back.

20 The Reg Guide 1.20 is for the reactor
21 internals vibration testing, it's mainly for the
22 reactor internals. For the PWRs steam generator's a
23 different component. However, in Reg Guide 1.20, due
24 to PWR steam dryer issues, they also included PWR steam
25 generators.

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1 CHAIRMAN STETKAR: That's right.

2 MR. WONG: And so there's a, I guess,
3 there's still not a consensus on whether steam
4 generator internals need to have vibration testing,
5 that will need to be clarified.

6 And from, you know, a historical
7 precedent, I'm not aware of PWR applicants that perform
8 vibration testing through an initial style testing for
9 steam generators.

10 CHAIRMAN STETKAR: Well, what, I think,
11 what I was asking was not based on precedent, I was
12 asking, are these steam generators -- what's the
13 staff's basis, technical basis, not precedent, because
14 just because we haven't done something in the past
15 doesn't mean, necessarily, that it's okay to not do it
16 in the future, what's the staff's technical
17 justification for approving that exception that they
18 took? There must be a technical basis.

19 MR. WONG: We have, for Section 3.9.2, we
20 have not completed the --

21 CHAIRMAN STETKAR: Okay.

22 MR. WONG: -- the overview. So because of
23 San Onofre events, the staff is looking at the steam
24 generator more closely.

25 CHAIRMAN STETKAR: Okay. So from my

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1 perspective, I'm just making a note, that basically
2 it's still unresolved, the whole issue of steam
3 generator vibration analysis is not yet fully resolved
4 in the staff's review, is that correct?

5 MR. WONG: Correct.

6 CHAIRMAN STETKAR: Okay, thank you.

7 MR. WONG: Okay.

8 CHAIRMAN STETKAR: He says 3.9.2 of the
9 DCD?

10 MR. WONG: Right.

11 MEMBER SCHULTZ: So just to be clear,
12 since you're doing this review at this point in time,
13 the statements associated in Chapter 14 may change,
14 your acceptance of the condition in --

15 MR. WONG: Possibly.

16 MEMBER SCHULTZ: -- Chapter 14 may change,
17 as a result of 3.9.2 reviews?

18 MR. WONG: Correct.

19 MEMBER SCHULTZ: Thank you.

20 CHAIRMAN STETKAR: Okay, thanks. So that
21 clarifies part of it. And we're pretty good of keeping
22 track of things, so I'm making note that we'll revisit
23 Chapter 14 for the final safety evaluation we'll make
24 sure that that's appropriately tied up.

25 Thank you, that helps. And with that,

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1 unless there are other questions for the staff,
2 regarding that topic? If not, we'll hear from Luminant
3 about Chapter 14 of the COLA.

4 MR. WOODLAN: Good afternoon. My name is
5 Don Woodlan. I'm the Manager of Nuclear Regulatory
6 Affairs for Luminant. Good afternoon, again. It's a
7 pleasure to make it here for the meeting. Thank
8 goodness the weather eased up just enough yesterday
9 that we were able to fly in.

10 And I'd also like to repeat what was said
11 earlier and provide my thanks for allowing us to present
12 this briefing on such short notice and such a brief time
13 since the safety evaluation was issued.

14 With that we can get into the briefing of
15 Chapter 14. And, again, to repeat what was already
16 said previously, which is what licensing managers are
17 supposed to do.

18 It does include Chapter 14, except for the
19 HF parts and the structural parts and those parts will
20 be covered with those chapters when they are completed
21 and we present those to ACRS.

22 As you know, Chapter 14 does focus on
23 testing, so there's not a lot of new design information
24 in it, most of the design information is in the specific
25 chapters.

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1 Here's the agenda we're following today.
2 We'll have an introduction. I'll briefly touch on the
3 SER open items, the SER license conditions and then Bob
4 Reible, who is sitting up here with me will present the
5 site-specific aspects of our design.

6 These are repeats of what we said in many
7 of our other presentations. The FSAR uses the IBR
8 incorporated by reference methodology. We've taken no
9 departures from the US-APWR DCD design.

10 All the COL items from the DCD have been
11 addressed in the FSAR. We have two SER open items,
12 which I'll touch on. We have five SER license
13 conditions, which will also be on a subsequent slide.
14 And there's no contentions pending before the ASLB that
15 relates to this chapter.

16 The SER open items we've already
17 mentioned. These are the two portions really, which
18 are not covered by Chapter 14 SE, because they're going
19 to be covered elsewhere and instead of 13.3.9, that
20 should be 14.3.9, that's a typo. And it is the human
21 factors and the structural design. Those are the only
22 two open items we have.

23 License conditions are not much different
24 than many of the license conditions we've presented in
25 the past. These all relate to implementation

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1 schedules and testing programs.

2 The schedules are very similar to other
3 license conditions we discussed, but basically the
4 staff wants a license condition to require Luminant to
5 present our plans and our schedules for when we're going
6 to do various testing.

7 And that's so they can prepare themselves
8 and be ready to observe and review our procedures. We
9 are committed to provide the procedures in advance of
10 the testing and to provide changes to those procedures,
11 as they occur, to the NRC inspectors.

12 They're also asking for several
13 commitments regarding how we intend to review the test
14 results and, as like the last one says, how we intend
15 to report changes.

16 None of these are conditions that give
17 Luminant any problem, we can handle all these. But my
18 personal opinion is, we probably didn't license
19 conditions to do these, we were more than willing to
20 make these commitments, but we can live with the license
21 condition.

22 CHAIRMAN STETKAR: I was going to ask you
23 how Luminant felt about, I'm going to ask the staff
24 about --

25 MR. WOODLAN: It's just a slightly

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1 larger --

2 CHAIRMAN STETKAR: -- the license
3 conditions --

4 MR. WOODLAN: -- administrative burden
5 having it --

6 CHAIRMAN STETKAR: I'll ask them, but --

7 MR. WOODLAN: -- as a license condition,
8 but --

9 CHAIRMAN STETKAR: -- I just wanted to
10 hear --

11 (Simultaneous speaking.)

12 MR. WOODLAN: -- either way, we're going
13 to do all that stuff, so whether it's a condition or
14 a commitment, either way, if it's a license condition
15 and if something comes up that we need to change it,
16 it's a bigger hassle.

17 CHAIRMAN STETKAR: That's --

18 MR. WOODLAN: Because it takes a license
19 amendment to fix it.

20 CHAIRMAN STETKAR: We'll ask the staff
21 those --

22 MR. WOODLAN: Okay. And with this, I'm
23 going to turn it over to Mr. Reible and he's going to
24 discuss some of the site-specific aspects that's
25 included in Chapter 14 of the FSAR.

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1 MR. REIBLE: Good afternoon. My name's
2 Bob Reible. The site-specific aspects for Chapter 14
3 Sections 14.0 verification programs and 14.1 specific
4 information to be included in preliminary final safety
5 analysis and Appendix 14b, design acceptance criteria
6 ITAAC closure. These sections are all IBR with no
7 departures or supplements.

8 Initial plant test program. The
9 site-specific program is consistent with MUAP-0809,
10 which was addressed in the DCD presentation. Test
11 review group is a subcommittee of the SORC for initial
12 startup testing.

13 The test procedures will be reviewed by
14 MHI, MNES, engineering, testing, operations,
15 maintenance, QA, licensing, as a minimum. Test
16 personnel meet the ANSI/ANS 3.1 standard.

17 Non-supervisory test engineers meet ASME
18 NQA-1-1994, Appendix 2A-1 criteria. Approved test
19 procedures available for the NRC will be available for
20 the NRC 60 days prior to use.

21 MR. WOODLAN: If I could interject? This
22 is Don Woodlan, again. The second sub-bullet there
23 under test procedures, I think in part, answers some
24 of the questions earlier, regarding the details of the
25 testing.

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1 This is where the details are worked out
2 and incorporated. And having participated when this
3 was done on Comanche Peak Units 1 and 2, it's a highly
4 iterative and very detailed activity.

5 Probably some others in the room have done
6 this, as well. And it does start with a product that
7 is usually prepared by the vendor, in this case, MHI.
8 But the test engineers, as well as the review committee,
9 which I sat on, goes through in extreme detail.

10 And it doesn't just, based on the original
11 product, you end up going to many other products just
12 for a single test procedure, to which you'll end up
13 going to the vendor's material. You'll go to the
14 various FSAR chapters that relate.

15 And then, things like the accuracy of their
16 instrumentation are examined in detail to make sure
17 that the accuracy is sufficient to complete the test
18 and verify the acceptance criteria created for the
19 test.

20 So I don't have any of the details you were
21 asking for, but I know that it's covered under that
22 bullet and -- okay, Bob. Next slide.

23 MR. REIBLE: Yes. Continuing on with the
24 initial plant test program. Before initial fuel load
25 first plant only and prototype tests are performed, or

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1 justification is provided that results are applicable,
2 a subsequent plant and are not repeated.

3 Scheduled for pre-op test procedures sent
4 to the NRC one year before corresponding pre-op tests
5 begin. And schedule for the startup test procedures
6 is sent to the NRC one year before initial fuel load.
7 Event based schedule for each major testing phase sent
8 to the NRC six months prior to pre-op testing beginning.

9 MR. WOODLAN: I think the first bullet
10 there, again, was partially asked about during the DCD
11 presentation. And it is addressed in the FSAR, but
12 only briefly.

13 But the way we addressed it was with our
14 understanding of the DCD, the reactor internals
15 vibration test and the rod cluster control assembly
16 testing is very standard. And because it's so
17 standard, it really is a first only type test and that
18 is sufficient to verify the design.

19 The other two tests, however, the natural
20 circulation and the pressurizer surge line, can vary
21 depending exactly on the products, and maybe the
22 arrangement could be a little different from plant to
23 plant.

24 And it specifically mentions in the DCD
25 that you need to perform some other tests first, like

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1 the reactor coolant pump flow test, the flow coast-down
2 test, and verify the results of those are sufficiently
3 similar to the plant that did the original test, before
4 we can just say, it's okay and that test covers me.

5 So there is some follow-up activity and
6 some justification needed for both of those others,
7 which is why they're prototypes that need to be verified
8 if you don't do them. That's our understanding, that's
9 how we wrote the FSAR.

10 CHAIRMAN STETKAR: Yes.

11 MR. REIBLE: Next slide. Initial plant
12 test program continued. The site-specific individual
13 pre-op test descriptions are for the UHS system, the
14 UHS ESW pump house ventilation systems.

15 CHAIRMAN STETKAR: Let me stop you there.
16 You probably, just to get it on the record, anticipated
17 from the discussion I had regarding DCD, I'll just
18 raise, for the record, the same questions.

19 In particular, the ESW the HVAC test as
20 described, and you own this one because you own that
21 system, just specifies verified design airflow not
22 maintain temperature in the area?

23 I know the ESW pump house is a little bit
24 different than a room in the reactor building, but it's
25 still given for functional verification not flow

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1 verification.

2 And the description, more importantly, in
3 my mind, the description of the ultimate heat sync
4 pre-op test, again, is written from the perspective
5 of -- the pre-op test just verifies that the equipment
6 works. The fans run and the pump works and the base
7 and transfer, you know, it's pumps and pipes and valves
8 type of stuff.

9 There is, I believe, a test that -- I'm not
10 sure where you're going to verify these PRA success
11 criteria, the single train now of all the way from the
12 RHR system out through the component the cooling water
13 system through the USWS through one cooling tower
14 basin, one train can remove core decayed heat.

15 Because I couldn't find anything in your
16 testing that does that, obviously, you know, you heard
17 the discussion about the DCD. So those are kind of my
18 comments back on these particular tests, the
19 site-specific.

20 MR. WOODLAN: And while I really don't
21 have answers, I was trying to research it --

22 CHAIRMAN STETKAR: Yes, I mean --

23 MR. WOODLAN: -- while we were waiting to
24 come up here. What I couldn't find is where, and of
25 course, we don't have all the PAR information on my

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1 computer, where the PAR under what circumstances, or
2 under what conditions they assume that single train.
3 Because everything else talks about 50 percent train,
4 which means you need two --

5 CHAIRMAN STETKAR: Yes, but I will tell
6 you that the PAR success criteria uses one train. I
7 mean, I can't remember, I'd have to go delve into the
8 PAR models and the success criteria.

9 If you look, their success criteria
10 tables, and I'd forgotten a section, in the PAR. It's
11 early when they talk about success criteria. And it's
12 always one out of four trains of CS/RHR for containment
13 and core coolant.

14 MR. WOODLAN: Okay.

15 CHAIRMAN STETKAR: Now, the real key is
16 what I don't know is at what time is the earliest time
17 after a reactor trip that that success criteria
18 applies?

19 MR. WOODLAN: Okay.

20 CHAIRMAN STETKAR: Because that's the
21 amount of heat that needs to be removed. I didn't do
22 enough research to find out what that earliest time is.

23 MR. WOODLAN: And that's where I --

24 CHAIRMAN STETKAR: Because the functional
25 test that's described in FSAR, I'm sorry, the DCD, just

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1 verifies that from at hot functional conditions, or
2 hot, I've forgotten exactly where you are in the startup
3 phase, that with two trains running you can remove, you
4 can cool down.

5 MR. WOODLAN: Yes.

6 CHAIRMAN STETKAR: But that doesn't tell
7 me whether I can at least stay there, or cool down with
8 only one train running.

9 MR. WOODLAN: And you covered exactly what
10 I would have --

11 CHAIRMAN STETKAR: And that's --

12 (Simultaneous speaking.)

13 MR. WOODLAN: -- when you check, yes.

14 CHAIRMAN STETKAR: But I don't when in
15 time, you know, I don't know what heat removal is the
16 most limiting, from the PRA perspective. I can tell
17 you, you know, look in the PRA, there are tables of
18 success criteria. I've forgotten which chapter it is,
19 I don't think I printed them out here.

20 But uniformly, when you go, there's a
21 column in that table that says CS/RHR and it's always
22 one out of four for success. And if you look at the
23 fault tree models they require all four failed.

24 That's despite what the licensing, you
25 know, 50 percent capacity says somebody did some

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1 thermal hydraulics analyses, apparently, to justify
2 one train is enough. What I just don't know is based
3 on what limiting heat input --

4 MR. WOODLAN: Yes.

5 CHAIRMAN STETKAR: -- was used in those?

6 MR. WOODLAN: Okay. I understand.

7 Sure.

8 MR. REIBLE: Next slide. Section 14.3
9 ITAAC. ITAAC schedule will be sent to the NRC per 10
10 CFR 52.99. Piping stress analysis, environmental
11 fatigue analysis, large core break analysis and pipe
12 break hazard analysis will be completed to support the
13 closing of piping design DAC.

14 ITAAC for site-specific electrical
15 interfaces with the offsite power system correspond
16 with the Tier 1 Section 3.2 and are in the COLA Part
17 10.

18 ITAAC for site-specific systems,
19 site-specific portions of plant systems, EP and
20 security hardware are in COLA Part 10. DCD Section
21 14.3 provides site-specific selection criteria and
22 methodology for EP and physical security ITAAC. Next
23 slide. That's it. That concludes my presentation.

24 MR. WOODLAN: And I think, from that
25 second bullet on this slide, you can tell the DAC and

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1 we're basically using the third option that was
2 presented during the DCD, which is that they will be
3 closed by performing these tests and inspection
4 activity, which timing-wise that's really the only way
5 you can do it.

6 CHAIRMAN STETKAR: Any Members have any
7 other questions for Luminant?

8 No? Thank you.

9 MR. WOODLAN: Thank you.

10 MR. REIBLE: Thank you.

11 CHAIRMAN STETKAR: And again, I
12 appreciate your effort getting up here.

13 MR. REIBLE: It was easier for me, I came
14 on Sunday.

15 MR. WOODLAN: Yes, you smart one.

16 CHAIRMAN STETKAR: That's the way.

17 MR. REIBLE: Don always wait until the
18 last minute.

19 CHAIRMAN STETKAR: But he made it, thereby
20 proving again that you don't need to plan ahead.

21 Ngola.

22 MR. OTTO: Thank you. Thanks again for
23 giving us the opportunity to present Comanche Peak
24 Chapter 14. And as was the DCD, this presentation is
25 very short.

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1 The next few slides just lists the members,
2 staff members who performed the review of the various
3 Chapter 14 sections. And currently there are no
4 technical open items, per say.

5 There are a number of IBR sections that are
6 listed there at the bottom and we talked about Section
7 14.3.2 and 14.3.9 already. And the only thing, we have
8 a generic open item, open item 1.1, which relates to
9 the completion of US-APWR SERs, so that's the only, more
10 or less, a placeholder at this point, related to
11 Comanche Chapter 14.

12 So that concludes the presentation. Do we
13 have a number of staff members here, who can answer your
14 questions, specific questions related to the sections?

15 CHAIRMAN STETKAR: Good. One question,
16 and that relates to the license conditions. As
17 Luminant mentioned in their presentation, there are
18 five license conditions and three of them, 14.1, 14.2
19 and 14.4 are basically conditions that require
20 submittal of schedules for testing programs.

21 And, you know, I'm not going to split hairs
22 about why three separate license conditions are needed
23 for that, because that's fine, that's bookkeeping and
24 indeed I've checked in other SRL applications and there
25 are other license conditions regarding submittal of

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1 testing schedules.

2 Who knows, not necessarily three separate
3 license conditions, but basically something that's
4 raised to a level of a license condition that requires
5 submittal of those testing schedules?

6 The two that I was curious about were 14.3
7 and 14.5. And those -- let me just read 14.3. "Filing
8 completion preoperational testing, the licensee shall
9 review and evaluate individual test results and confirm
10 the test results are within the range of acceptable
11 values predicted or otherwise confirmed that the tested
12 systems performed specific functions in accordance
13 with the FSAR.

14 The licensee shall provide written
15 notification to the Director of NRO upon completion of
16 pre-critical and criticality testing upon submission
17 of this notification the licensee is authorized to
18 perform low power testing as described in the FSAR and
19 operate the facility at reactor steady state core power
20 levels at not in excess of five percent power in
21 accordance with the conditions specified herein.

22 And in 14.5 it says, within one month of
23 a change any changes to the initial startup testing
24 program described in Chapter 14 of the CPNPP Units 3
25 and 4 CRF SLAR made in accordance with the provisions

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1 of 10 CFR 50.59, et cetera, shall be reported in
2 accordance with 10 CFR 50.59."

3 My question is, why do we need license
4 conditions for those two things? Why do we need a
5 license condition that the applicant has to report
6 separately that they have verified test results
7 conformed with the FSAR?

8 And why do we need a separate license
9 condition that requires the applicant to report these
10 in accordance with the law? I don't understand. I've
11 not seen any other COLAs that have those similar types
12 of license conditions. So what I'm curious about is
13 why, why for this one?

14 MR. OTTO: I don't have an answer. Is
15 there anyone in the staff who can maybe answer that
16 question? Or we can get back to you with the specifics.

17 CHAIRMAN STETKAR: Okay. I'd appreciate
18 that, because it sounds to me that these are yet
19 additional requirements that, to me, they sound like
20 duplicate requirements.

21 MR. OTTO: Okay.

22 CHAIRMAN STETKAR: And if there's a need
23 for them I'd like to understand, you know, why there's
24 a particular need for this COLA, as opposed to others,
25 because I've looked at others and I haven't seen similar

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1 requirements there. I have on the test plan
2 submittals.

3 MR. OTTO: Okay.

4 MEMBER SCHULTZ: And I think it's
5 important to examine that and validate whether the
6 license condition is the appropriate way in which to
7 document those and look for responses. I understand
8 the comment by the applicant related to license
9 conditions versus commitments.

10 But in my experience, license conditions
11 are in fact quite a level above a commitment for a
12 licensee, and therefore, I think we ought to treat them
13 that special, as well, and not put lots of license
14 conditions and by that, perhaps, decrease the level of
15 intensity, but that both the NRC and the applicant, or
16 licensee, when we get to that point, treats those
17 conditions.

18 MR. OTTO: Okay.

19 MEMBER SCHULTZ: If there's a bunch of
20 them then everybody might treat them with a little bit
21 less respect than I think they're currently treated at
22 this point. So we ought to use them carefully and
23 judicially.

24 MR. OTTO: Okay. Thank you.

25 CHAIRMAN STETKAR: Thanks, Steve.

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1 Anything else for the staff? Okay. Well, thank you.
2 What I'll do first here is, we've given MHI about as
3 much time as my compadres here will allow me to drag
4 this out to find out, do you have any responses to any
5 of the items we raised earlier? And if you don't that's
6 fine, I mean, you can get back to us later. If you do,
7 that would be good.

8 MR. SPRENGEL: Okay, one definite and as
9 I read that I'll follow with the other. For the
10 accumulator, we've pointed to the table, you know, in
11 numerous ITAACs, but specifically ITAAC Table 2.4.4-5
12 and it's --

13 CHAIRMAN STETKAR: 4.4-5, okay.

14 MR. SPRENGEL: And it's ITAAC 7.B, bravo.

15 CHAIRMAN STETKAR: 2.4.4-5.

16 MR. SPRENGEL: -5 ITAAC 7.B and then 7.B,
17 bravo, .I, indigo, .B, bravo, verifying the
18 coefficients.

19 CHAIRMAN STETKAR: Okay.

20 MS. STEINMAN: So there's the water
21 levels. This is Rebecca Steinman. That ITAAC
22 verifies the water level volumes, not levels, volumes,
23 for each one of the flow regimes and the flow
24 coefficients.

25 CHAIRMAN STETKAR: And the flow co, that's

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1 the important thing, the volume of the flow
2 coefficients, okay.

3 MS. STEINMAN: Right. So I believe that
4 when you find the ITA, that's the second thing,
5 7.B.I.B., that's where you'll find that information.

6 CHAIRMAN STETKAR: Okay. Thank you.

7 MR. SCHMIDT: This is Jeff Schmidt from
8 the staff. Just to help out there, if you look at Table
9 2.4.4-6 in Tier 1 document, Page 2.4-64, that addresses
10 your question on the scaling bias and uncertainty as
11 part of the resistance coefficients, so you can also
12 look there.

13 CHAIRMAN STETKAR: Okay, thanks. We'll
14 get that from the transcript. Thank you. Thank you.
15 That helps. And that will be done, essentially, will
16 be done now for every COLA. That is not a first plant
17 only designated condition?

18 MS. STEINMAN: That is correct.

19 CHAIRMAN STETKAR: Okay.

20 MS. STEINMAN: It is an ITAAC.

21 CHAIRMAN STETKAR: Okay. It is an ITAAC?

22 MS. STEINMAN: That is correct.

23 CHAIRMAN STETKAR: Okay. Thank you.

24 MS. STEINMAN: And then, I wanted to point
25 out that there is a ventilation capability test

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1 described and its whole point is to verify that the
2 HVACs of various systems can maintain design
3 temperatures for areas in containment and where ESF
4 equipment is handled. Does that meet the intent of
5 what you were trying --

6 CHAIRMAN STETKAR: I need a note about
7 that one.

8 MS. STEINMAN: Okay.

9 CHAIRMAN STETKAR: I'm not sure.

10 MS. STEINMAN: I can give you the number
11 of it, if it'll help you out, but it's a --

12 CHAIRMAN STETKAR: Yes, give me the
13 number.

14 MS. STEINMAN: 14.2.12.2.4.11.

15 CHAIRMAN STETKAR: Yes, .2.4.11.

16 MS. STEINMAN: And it's called
17 ventilation capabilities.

18 CHAIRMAN STETKAR: I remember looking at
19 that, 2.4.11?

20 The only acceptance criterion that I could
21 find in that, let me make sure I've not mischaracterized
22 something, is that it's only if airflow is achieved.

23 MS. STEINMAN: Okay. I don't have my
24 computer, sorry. I guess for right now we might --

25 CHAIRMAN STETKAR: Take a look at, let's

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1 see, any locations that contain safety related
2 equipment.

3 It's -- I'm sorry. That's only the normal
4 ventilation systems. That test when they turn that
5 test, and I'll just read my notes, test summarized in
6 Section 14.2.12.2.4.11 are performed during power
7 ascension, those tests confirm that the normal
8 ventilation systems maintain acceptable temperatures
9 in the containment and the locations that contain
10 safety-related equipment.

11 However, those tests do not confirm that
12 the safety-related ventilation systems will maintain
13 acceptable temperatures. Normal ventilation, for
14 example, would be reactor building normal ventilation.

15 MR. HICKS: This is Tom Hicks with MNES.
16 It's ventilation systems for the ESF areas, though.

17 CHAIRMAN STETKAR: But normal ventilation
18 systems for the ESF areas means that I'm sitting there
19 and nothing is happening in the plant and indeed the
20 normal ventilation system is operating and temperature
21 is okay.

22 MR. HICKS: Well, the acceptance criteria
23 in Number 1 talks about the design basis environmental
24 conditions in the design basis heat load, so I think --

25 CHAIRMAN STETKAR: No.

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1 MR. HICKS: I believe this is intended to
2 cover those configurations.

3 CHAIRMAN STETKAR: Okay, be careful,
4 because I read it, I'm going to pull up the test section
5 here, I'm just excerpting from my notes, but I
6 interpreted that as the normal containment ventilation
7 systems and the normal reactor building ventilation
8 systems, not the ESF ventilation systems.

9 MR. HICKS: We can confirm that, but I
10 believe the ventilation we're talking about, because
11 the ones that you assumed the design basis conditions,
12 or the ESF ventilation systems in those various rooms.
13 But we can confirm that.

14 CHAIRMAN STETKAR: Good. Check that. I
15 did come across that one and I thought okay, well they
16 are measuring temperatures here.

17 MR. HICKS: Right.

18 CHAIRMAN STETKAR: But I thought that it
19 was hooked to the normal, you know, the normally
20 operating ventilation system --

21 MR. HICKS: Yes, okay.

22 CHAIRMAN STETKAR: -- which get isolated
23 under an ESF condition.

24 MR. HICKS: Yes, okay.

25 MR. SPRENGEL: Okay, and beyond that I

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1 think there were numerous other detail clarifications
2 that we'll get together --

3 CHAIRMAN STETKAR: Yes, that's fine.

4 MR. SPRENGEL: -- and submit at a later
5 date.

6 CHAIRMAN STETKAR: Okay. Thank you.
7 All right, what I'd like to do now before we -- any of
8 the Members have any more questions? Okay. What I'd
9 like to do is two things, open up the bridge line, so
10 that if we have any comments from members of the public
11 on the bridge line, we can entertain those comments.

12 And while we're doing that, I'll ask, are
13 there any comments from any people in the room here?
14 None. So I'll wait to get the bridge line open and see
15 if we have any people --

16 MR. SPRENGEL: Can I ask for, just maybe
17 a little discussion and clarification on the questions
18 that were posed to the staff on the steam vibration.

19 CHAIRMAN STETKAR: Steam generator
20 vibration?

21 MR. SPRENGEL: Yes. Sorry, I didn't
22 complete my thought there.

23 CHAIRMAN STETKAR: Yes.

24 MR. SPRENGEL: Okay, so the additional
25 testing that was questioned, I mean, we are still in

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1 interactions with the staff on the RAI that was
2 mentioned, so there are ongoing discussions. I just
3 wanted to see if you could get any more insight.

4 CHAIRMAN STETKAR: I'll tell you, Ryan,
5 the only thing I stumbled across it was and literally
6 it was that one statement that I've mentioned a couple
7 of times --

8 MR. SPRENGEL: Right.

9 CHAIRMAN STETKAR: -- in the SER that said
10 that MHI had taken an exception to the part of Reg Guide
11 1.20. Reg Guide 1.20, as the staff mentioned, is
12 primarily associated with reactor vessel internals,
13 but it does extend for PWRs out to include steam
14 generator tubes, steam generator internals, I think,
15 is the term. And staff basically noted that that
16 exception had been taken and it just says this is
17 acceptable without any further justification.

18 So I'm basically asking the staff why
19 they've accepted that justification without, at least
20 in the safety evaluation, any further technical
21 justification for their acceptance. And it's more a
22 question for them at the moment, recognizing that, you
23 know, the information that we received after the break
24 is that their review of the steam generators is still
25 ongoing and that in principle some estimate

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1 requirements might be added, but from our perspective,
2 the snapshot that we have of Chapter 14 basically says
3 they looked at that and have agreed that no vibration
4 testing is required. And I can't find the technical
5 justification for their --

6 MR. SPRENGEL: Okay.

7 CHAIRMAN STETKAR: -- acceptance.

8 MR. SPRENGEL: So let me rephrase it, I
9 guess. So it's not a question of having testing or not,
10 it's the evaluation of the acceptability of our
11 position and our exception? Is that, there's kind of
12 a gap, so I don't want myself to jump to a conclusion
13 and say, you know, the ACRS is asking for testing to
14 be done, because I don't think that's what you're
15 saying.

16 CHAIRMAN STETKAR: At the moment, first of
17 all, this is ACRS asking anything, it's John Stetkar
18 as an individual member in a subcommittee meeting
19 raising a question. And that's important, because
20 that's the way we operate. So this is not an ACRS
21 request for anything, it's simply my personal question.

22 And I'm not inferring that testing should
23 be required, even from my perspective, what I'm looking
24 for is the staff's technical justification why testing
25 is not necessary. If the staff has adequate, you know,

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1 justification why testing isn't necessary that's fine.

2 MEMBER BROWN: Why they accepted your
3 exception?

4 CHAIRMAN STETKAR: Yes. Right.

5 MR. SPRENGEL: Okay, so that was helpful.

6 CHAIRMAN STETKAR: So that's --

7 MR. SPRENGEL: Yes.

8 CHAIRMAN STETKAR: -- you know, personal.

9 MR. SPRENGEL: And, you know, again, we
10 have ongoing interactions and there's --

11 CHAIRMAN STETKAR: Yes.

12 MR. SPRENGEL: -- a specific RAI and I
13 think that detail will be helpful.

14 CHAIRMAN STETKAR: That will be fine.

15 MEMBER SCHULTZ: And based on the
16 discussion, I would just add that, the Subcommittee,
17 those that are here and those that have expressed to
18 any of you on this particular issue think that it's in
19 the right place at this time, based on the comments from
20 the staff, as they continue to review.

21 MR. SPRENGEL: Thank you.

22 CHAIRMAN STETKAR: Anything else? Since
23 I've heard some pops and snaps in our bridge line, could
24 someone who's out on the bridge line do me a favor and
25 just say something so we can confirm it's open.

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1 This sounds silly if you've never
2 participated, but we have absolutely no positive way
3 of determining if the bridge line is open. So if
4 someone would just do me a favor and say something, I'd
5 appreciate it.

6 MS. THOMAS: This is Ruth Thomas, can you
7 hear me? I'm on the bridge line.

8 CHAIRMAN STETKAR: Thank you, Ruth. Yes,
9 we can. So that confirms that the bridge line is open.
10 Now, are there any people on the bridge line that would
11 like to make a statement or a comment?

12 MS. THOMAS: I'd like to ask some
13 questions. I don't know, I'm going to try to limit them
14 and go back and look and see which ones I think are more
15 significant, at least, to me.

16 When you were talking about the Table 14,
17 it sounded like this was something that you were putting
18 together, information about the flood level
19 measurements, is that right?

20 CHAIRMAN STETKAR: Did you say flood level
21 measurements?

22 MS. THOMAS: Yes, I'm not sure that that's
23 what it was about. Now that was, well I had another
24 question about Chapter 2, what --

25 CHAIRMAN STETKAR: Ruth.

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1 MS. THOMAS: -- Table 14 is in what
2 chapter?

3 CHAIRMAN STETKAR: Ruth, just for our
4 purposes, for the Subcommittee's benefit, please be
5 careful, that this meeting is on Chapter 14, so we don't
6 necessarily from the ACRS Subcommittee have any members
7 who are immediately cognizant of other chapters
8 available, nor does MHI or the staff. We're glad to
9 take your comments and we'll put them on the record,
10 but just be aware of the focus of today's meeting.

11 MS. THOMAS: Well, you mean, this is
12 something that's going to be taken up later?

13 CHAIRMAN STETKAR: Chapter, if you're
14 talking about Chapter 2, we've had, I'd have to go back
15 and look at my schedule, I know that some sections of
16 Chapter 2 are still to be reviewed, in particular, I
17 believe, it's sections for the COLA, the site-specific
18 sections.

19 MS. THOMAS: Yes, I know that. I think
20 that's -- and you were talking about, like,
21 maintenance, the subject of maintenance was to be
22 excluded from whatever was in this.

23 And I think before that you were talking
24 about Chapter 16 and 19. Anyways, I just was, you know,
25 trying to get an idea how that table was going to be

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1 used.

2 CHAIRMAN STETKAR: Okay. Ruth, one thing
3 that may help you, if you're asking about something that
4 we were discussing specifically, the transcripts of
5 this meeting will be available.

6 MS. THOMAS: It will? That will help.

7 CHAIRMAN STETKAR: Yes. The transcripts
8 of all of our meetings, provided that it's not
9 proprietary information and none of the material that
10 we discussed was proprietary, are available to the
11 public.

12 MS. THOMAS: Yes, I've gotten, I'm glad
13 you mention that, because I've gotten a copy of one of
14 the transcripts and I didn't realize that all of them
15 were transcribed.

16 CHAIRMAN STETKAR: Unless the meeting
17 pertains to security-related information, or
18 proprietary information, all of our Subcommittee and
19 full committee transcripts are fully available to the
20 public and you can find those on our website. So that
21 may help you a little bit, if you had some question about
22 particular discussion of a specific table today.

23 MS. THOMAS: Yes, and that would reduce a
24 number of questions I had.

25 CHAIRMAN STETKAR: Okay.

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1 MS. THOMAS: And could that -- now, that
2 was sent to me in hard copy, because of course as I said,
3 I don't have a computer.

4 CHAIRMAN STETKAR: Okay, we can arrange
5 that, that's not a problem. Offline --

6 MS. THOMAS: Okay, and so that would apply
7 to probably all of my, or most of them, like when you
8 were talking about normal temperature and also you
9 talked quite a bit about the generators vibrating.

10 CHAIRMAN STETKAR: Right.

11 MS. THOMAS: And so all of that would be
12 in the transcript?

13 CHAIRMAN STETKAR: Every word that was
14 spoken in today's meeting will be in the transcript,
15 verbatim.

16 MS. THOMAS: Well terrific.

17 CHAIRMAN STETKAR: So what I'd like to
18 suggest, unless you have a specific point, is that you
19 contact our staff, you can give them a call, just call
20 our office. Girija, do you have the phone number?

21 MR. SHUKLA: Yes. Ruth, like you called
22 me this morning for the bridge line, just give me a call
23 and give me your address and I'll send it to you.

24 CHAIRMAN STETKAR: Yes, and Girija --

25 MS. THOMAS: Okay.

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1 CHAIRMAN STETKAR: It'll take a few days.

2 MS. THOMAS: Yes.

3 CHAIRMAN STETKAR: It typically takes a
4 few days, or a week or so, before the transcripts are
5 available, because we have to go through the normal
6 process of being turned into proof of material, but
7 we'll be sure to get you the transcript.

8 MS. THOMAS: Okay, great. Well, thank
9 you very much, I appreciate it.

10 MR. SHUKLA: Okay.

11 CHAIRMAN STETKAR: Thank you. Are there
12 any other comments from anyone on the bridge line? If
13 not, thank you very much. We'll re-close the bridge
14 line, only because, as I said, it creates pops and
15 crackles and noise in here and it's not that we have
16 the highest tech system in the world.

17 And as we usually do at the conclusion of
18 a subcommittee meeting, what I'd like to do is go around
19 the table and see if any of the Members have any final
20 comments or questions that they'd like to make? And
21 I'll start with Mr. Brown.

22 MEMBER BROWN: I'm through. I thought it
23 was a -- they answered questions. I think I got my
24 questions answered, sufficiently, might not
25 have -- I'll take them at face value right now.

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1 I'm looking forward actually to seeing the
2 revision with the additional information on the data
3 diodes for all external communications. We only got
4 that in what I would call revision form, or proposed
5 revision form.

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

7 MEMBER BROWN: And then my question on the
8 testing, I'm looking forward to seeing that --

9 CHAIRMAN STETKAR: That's a bit of an
10 artifice of the fact, you know, the way we're doing
11 these reviews and --

12 MEMBER BROWN: Yes, I --

13 CHAIRMAN STETKAR: This is an interim
14 review and things do tend to be --

15 MEMBER BROWN: Not a problem.

16 CHAIRMAN STETKAR: -- we have a snapshot
17 of Chapter 14 where it is.

18 MEMBER BROWN: It was a very thorough
19 feedback they gave us from the Subcommittee meeting --

20 CHAIRMAN STETKAR: Yes.

21 MEMBER BROWN: -- which was very useful.
22 And I did not think about the testing at that particular
23 time. And I've got the latest version, which is quote
24 official version, or official, whatever it is, of Rev
25 4, but that obviously is still behind the eight ball

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1 from that standpoint.

2 CHAIRMAN STETKAR: Yes, Rev 4 of the DCD
3 was issued in August of 2013.

4 MEMBER BROWN: Right.

5 CHAIRMAN STETKAR: So it's, you know --

6 MEMBER BROWN: That's right.

7 CHAIRMAN STETKAR: And of course --

8 MEMBER BROWN: There were other changes,
9 there was a changed version --

10 CHAIRMAN STETKAR: Right.

11 MEMBER BROWN: -- then there was the
12 official version, so we've got those, so we're up to
13 date on that standpoint. So that was it for me.

14 CHAIRMAN STETKAR: Good. Dr. Bley.

15 MEMBER BLEY: No, nothing more.

16 CHAIRMAN STETKAR: Thank you. Dr.
17 Schultz?

18 MEMBER SCHULTZ: I appreciate the
19 preparation that was done to prepare for this meeting.
20 I felt all the presentations were very well done. And
21 I appreciate both the staff and applicants' work even
22 within the meeting to get answers to our questions, so
23 very well done, thank you.

24 CHAIRMAN STETKAR: Thank you.

25 MEMBER BROWN: Let me speak for Joyce,

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1 since she had to leave. She is interested in those,
2 I think, the answers on the severe accident, the reactor
3 cavity and whatever, there were two or three questions
4 that she asked, I don't remember each and every one of
5 them, but she is very interested in those responses,
6 just to re-emphasize that.

7 CHAIRMAN STETKAR: Thank you. And I
8 don't have anything to add, other than the things I've
9 already said. Again, I'd like to thank everyone. It
10 was a good presentation. I appreciate everyone
11 bearing with us with the questions.

12 And, again, I do appreciate everyone's
13 flexibility over the last, not just over the last day
14 with the travel arrangements, but flexibility over the
15 last, about a week-and-a-half, in terms of getting the
16 material together for this meeting, I do very much
17 appreciate that.

18 We will see all of you, I think, in two days
19 at the full committee meetings. So with that, thank
20 you, and we are adjourned.

21 (Whereupon, the meeting in the
22 above-entitled matter was concluded at 3:49 p.m.)
23
24
25

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Presentation to ACRS Subcommittee

Chapter 14 Verification Programs (except 14.3.2 and 14.3.9)

March 4, 2014

Mitsubishi Heavy Industries, Ltd.

Presenters



Lead Presenter

Rebecca Steinman, MNES

Technical Experts

Ryan Sprengel, MNES

Tom Hicks, MNES

Kenji Mashio, MNES

MHI engineers (over the bridgeline)

Acronyms



ATWS	anticipated transient without scram
COL	combined license
DAC	design acceptance criteria
HFT	hot functional test
ITAAC	inspections, tests, analyses, and acceptance criteria
ITP	initial test program
MHI	Mitsubishi Heavy Industries, Ltd.
MNES	Mitsubishi Nuclear Energy Systems, Inc.
NRC	U.S. Nuclear Regulatory Commission
NSSS	nuclear steam supply system
PRA	probabilistic risk assessment
PSC	pipng systems and components
RCCA	rod cluster control assembly
RG	Regulatory Guide
SSC	structures, systems, and components
SRP	Standard Review Plan

14 Verification Programs



Section No.	Description
14.1	Specific Information to be Included in Preliminary/ Final Safety Analysis Reports
14.2	Initial Plant Test Program
14.3	Inspections, Tests, Analyses, and Acceptance Criteria

14.2 Initial Plant Test Program



- **Based on regulatory guidance contained in RG 1.68 Revision 3**
 - ✓ Includes testing of unique US-APWR design features.
 - ✓ Includes transient tests that demonstrate the ability to handle significant plant perturbations.
 - ✓ Exceptions to RG 1.68 Rev. 3 are described in DCD Appendix 14A
- **Conduct of test program is the responsibility of the COL licensee**

14.2 Initial Plant Test Program



➤ Construction Testing

- ✓ Not within scope of ITP in DCD Section 14.2.

➤ Preoperational Testing

- ✓ Begins after completion of construction testing and completes prior to fuel load.
- ✓ Performed in cold conditions and at elevated temperatures produced by reactor coolant.

14.2 Initial Plant Test Program



➤ Startup Testing

- ✓ Begins after completion of preoperational testing.
- ✓ Include steady-state and transient tests.
- ✓ Demonstrates adequate performance of the nuclear steam supply system (NSSS) and the other systems at various power levels.

14.2 Initial Plant Test Program



➤ Preoperational Testing Objectives

- ✓ Demonstrate SSCs operate in accordance with design in all operating modes throughout the full design operating range.
- ✓ Verify that interactions between systems and components are consistent with design bases.
- ✓ Validate, to the extent practical, plant response to transients, failures or malfunctions.
- ✓ Demonstrate, to the extent practical, performance of safety-related SSCs and design features during normal and anticipated abnormal operating conditions.

14.2 Initial Plant Test Program



➤ Preoperational Testing Includes

- ✓ Manual and automatic operation of systems and components in alternate or secondary modes of control and operation.
- ✓ Demonstration of expected system operation following a loss of power and in degraded modes for which the system is designed to remain operational.
- ✓ Verification of proper functioning of instrumentation and controls, permissive and prohibit interlocks, and equipment protective devices.
- ✓ System vibration, expansion, and restraint testing.

14.2 Initial Plant Test Program



➤ Startup Testing Objectives

- ✓ Perform a controlled and safe initial core loading.
- ✓ Achieve initial criticality in a controlled and safe manner.
- ✓ Assure plant operation remains within design and operating parameters during low power and subsequent power ascension testing.
- ✓ Confirm the operability of plant systems and design features that could not be completely tested during preoperational testing.
- ✓ Provide assurance that the integrated dynamic response is in accordance with design for plant events.

14.2 Initial Plant Test Program



- **Startup testing is conducted in four phases**
 - ✓ Initial fuel loading and pre-critical testing
 - ✓ Initial criticality tests
 - ✓ Low power tests (less than 5% power)
 - ✓ Power ascension tests (from 5% to 100% of rated power)

14.2 Initial Plant Test Program



➤ First-of-a-Kind Test

First-of-a-kind testing is performed to verify performance parameters for new or unique design features.

- 1) Reactor Internals Vibration Test
- 2) Rod Cluster Control Assembly (RCCA)
Misalignment Measurement and Radial Power
Distribution Oscillation Test
- 3) Natural Circulation Test
- 4) Pressurizer Surge Line Hot Functional Test (HFT)
Performance Test

14.2 Initial Plant Test Program



➤ First-of-a-Kind Test (cont'd)

- ✓ The COL licensee for the first plant is to perform these tests.
- ✓ For subsequent plants
 - Tests 1) and 2) are not performed.
 - Tests 3) and 4) are performed or the COL licensee provides a justification that the results of the first-plant only tests are applicable to the subsequent plant and are not required to be repeated.

14.2 Initial Plant Test Program



➤ Transient Tests

- ✓ RCS Flow Coast-Down Test
- ✓ Pseudo Rod Ejection Test
- ✓ Dynamic Automatic Turbine Bypass Control Test
- ✓ Natural Circulation Test
- ✓ Remote Shutdown Test
- ✓ Loss of Offsite Power (LOOP) at Greater Than 10% Power Test
- ✓ Plant Trip from 100% Power Test
- ✓ 100% Load Rejection Test

14.2 Initial Plant Test Program



➤ SE Open Item

- ✓ Phase 2 SE did not identify any open items related to DCD Section 14.2

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



- 14.3.1 - Introductory information
- 14.3.2 - Content of Tier 1 Chapter 1 and the introduction to the Tier 1 material
- 14.3.3 - General information about how Design Descriptions and ITAAC are presented in Tier 1 Chapter 2
- 14.3.4 - Summary about how ITAAC are developed and described in Tier 1 Chapter 2
- 14.3.5 - Interface requirements identified in Tier 1 Chapter 3

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



- Tier 1 contains information to be certified by the NRC as part of its approval of the US-APWR standard design.
- The type of information and the level of detail included in Tier 1 are based on a graded approach commensurate with the safety significance of the SSCs for the design.
- Tier 1 is consistent with NUREG-0800, “Standard Review Plan” (SRP) 14.3.

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ Tier 1 Material

Chapter 1 Introduction

- Definitions
- General provisions
- Figure legend
- TAG numbers

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ Tier 1 Material (cont'd)

Chapter 2 Design Descriptions and ITAAC

- 2.1 Site Parameters
- 2.2 Structural and Systems Engineering
- 2.3 Piping Systems and Components
- 2.4 Reactor Systems
- 2.5 Instrumentation and Controls
- 2.6 Electrical Systems
- 2.7 Plant Systems

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ Tier 1 Material (cont'd)

Chapter 2 Design Descriptions and ITAAC

- 2.8 Radiation Protection
- 2.9 Human Factors Engineering
- 2.10 Emergency Planning
- 2.11 Containment Systems
- 2.12 Physical Security Hardware

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ Tier 1 Material (cont'd)

Chapter 3 Interface Requirements with Site-Specific Systems

- UHS
- Fire protection system
- Essential service water system
- Electrical system

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ Tier 1 Selection Criteria

- ✓ Features or functions necessary to satisfy the NRC's regulations
- ✓ Safety-related SSCs
- ✓ Severe accident design features
- ✓ Risk insights and key assumptions from the probabilistic risk assessment (PRA) related to the SSC
- ✓ Risk insights and key assumptions from key safety and integrated plant safety analyses

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



- **Information particularly significant to selection of top-level requirements for Tier 1**
 - ✓ Table 14.3-1a Design Basis Accident Analysis Key Design Features
 - ✓ Table 14.3-1b Internal and External Hazards Analysis Key Design Features
 - ✓ Table 14.3-1c Fire Protection Key Design Features
 - ✓ Table 14.3-1d PRA and Severe Accident Analysis Key Design Features
 - ✓ Table 14.3-1e ATWS Key Design Features
 - ✓ Table 14.3-1f Radiological Analysis Key Design Features

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ Design Acceptance Criteria (DAC)

- ✓ US-APWR DAC are only expected for one area, which is still under review by the staff
 - Piping systems and components (PSC) design including stress analyses, environmental fatigue analyses and pipe break hazard analyses

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ DAC ITAAC Closure Options

- ✓ Closure through amendment of the design certification rule
- ✓ Closure through the COLA review process - A COL application contains the required design and analysis information needed to close the DAC ITAAC
- ✓ Closure after COL issuance - The NRC issues a COL with DAC ITAAC still open and inspects DAC ITAAC closure as part of the construction inspection process

14.3 Inspections, Tests, Analyses, and Acceptance Criteria



➤ SE Open Item

RAI No.	Question No.	RAI Topic / NRC Concern	RAI Response / DCD Impact
992-6999	07.09-26	<ol style="list-style-type: none">1. Sufficient evidence to demonstrate that the use of O-VDUs enhance the performance of the safety system2. ITAAC that adequately verifies testing for normal and abnormal data transmission conditions for all non-safety to safety interfaces	RAI 992-6999 is currently listed in eRAI as Unresolved-Closed since the staff issued a follow-up as RAI 1076-7368, Q 07.09-27. MHI's response was officially submitted via MHI letter UAP-HF-14016 on February 25, 2014.

Summary



- **The US-APWR Verification Programs conform to the relevant regulatory requirements.**
 - ✓ ITP conform to RG 1.68 Rev. 3 with any exceptions noted in DCD Appendix 14A
 - ✓ ITAAC conform to guidance in RG 1.206 and NUREG-0800 Section 14.3.

- **US-APWR DAC exist for only one area: piping design**



Presentation to the ACRS Subcommittee

MHI US-APWR Design Certification Application Review

Safety Evaluation Report (SER) with Open Items

Chapter 14: Verification Programs

March 4, 2014

Staff Review Team

- **Mechanical Vendor Inspection Branch**
 - ◆ Yamir Diaz-Castillo– Section 14.2

- **Division of New Reactor Licensing Branch II**
 - ◆ Ngola Otto– Section 14.3

- **Mechanical Engineering Branch**
 - ◆ Ian Tseng – Section 14.3.3
 - ◆ Thomas Scarbrough – Section 14.3

- **Reactor Systems, Nuclear Performance, and Code Review Branch**
 - ◆ John Budzynski – Section 14.3.4
 - ◆ Jeffrey Schmidt – Section 14.3.4

Staff Review Team

- **Instrumentation, Controls, and Electronics Engineering Branch II**
 - ♦ **Dinesh Taneja – Section 14.3.5**
 - ♦ **Khoi Nguyen – Section 14.3.5**
 - ♦ **Joseph Ashcraft – Section 14.3.5**
- **Electrical Engineering Branch**
 - ♦ **Tania Martinez-Navedo – Section 14.3.6**
- **Balance of Plant and Fire Protection Branch**
 - ♦ **Tarico Sweat– Section 14.3.7**
- **Radiation Protection and Accident Consequences Branch**
 - ♦ **Ronald LaVera – Section 14.3.8**
 - ♦ **Stephen Williams – Section 14.3.7**

Staff Review Team

- **NSIR New Reactor Licensing Branch**
 - ♦ **Bruce Musico – Section 14.3.10**

- **Containment and Ventilation Branch**
 - ♦ **David Nold– Section 14.3.7**
 - ♦ **Syed Haider – Section 14.3.11**
 - ♦ **Clint Ashley – Section 14.3.11**

- **NSIR Reactor Security Licensing Branch**
 - ♦ **Pete Lee– Section 14.3.12**

- **ITAAC and Generic Communications Branch**
 - ♦ **Christopher Welch– Section 14.3 & Tier 1**

- **Project Managers**
 - ♦ **Lead PM: Perry Buckberg**
 - ♦ **Chapter PM: Ngola Otto**

Chapter 14 Review Status

SRP Section/Application Section		Number of OI
14.2	Initial Plant Test Program	0
14.3	Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC)	0
14.3.3	ITAAC for Piping Systems and Components	0
14.3.4	ITAAC for Reactor Systems	0
14.3.5	ITAAC for Instrumentation and Control Systems	1
14.3.6	ITAAC for Electrical Systems	0
14.3.7	ITAAC for Plant Systems	0
14.3.8	ITAAC for Radiation Protection	0
14.3.10	ITAAC for Emergency Planning	0
14.3.11	ITAAC for Containment Systems	0
14.3.12	ITAAC for Physical Security Hardware	0
Totals		1

- The SE excludes sections 14.3.2 and 14.3.9, which are still under review.

Description of Open Items

- RAI 1076-7368, Question 07.09-27 (Follow-up to RAI 992-6999, Question 07.09-26):
The applicant has not provided a satisfactory ITAAC to verify that the as-built protection and control systems are separate such that failure of any control system or component would not impact the performance of safety functions to satisfy the GDC 24 requirements. The Open Item applies to Section 14.3.5.
- Status: Open Item can be closed when the applicant provides appropriate ITAAC in DCD Tier 1, Table 2.5.1-6 to verify that the as-built protection system is separate from control system such that any failure in the control system will not impact the performance of safety functions. This is also an Open Item in the Chapter 7 Safety Evaluation (SE).



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Comanche Peak Nuclear Power Plant, Units 3 and 4

ACRS US-APWR Subcommittee



**FSAR Chapter 14 –
Verification Programs**

March 4, 2014



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Agenda

- Introduction**
- SER Open Items**
- SER License Conditions**
- Site-Specific Aspects**



Introduction

- ❑ FSAR uses IBR methodology**
- ❑ No departures from US-APWR DCD**
- ❑ All COL Items addressed in FSAR**
- ❑ Two SER Open Items**
- ❑ Five SER License Condition**
- ❑ No contentions pending before ASLB**



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SER Open Items

14.3.2-1 Issue SER with Open Items for FSAR 14.3.2 (IBR)

13.3.9-1 Issue SER with Open Items for FSAR 14.3.9 (IBR)



SER License Conditions

Applicant-Proposed

14-1 ITP implementation

NRC-Proposed

14-2 Pre-op and S/U procedure schedule

14-3 Licensee review/evaluate pre-op test results

14-4 Operational program (ITP) schedule

14-5 Report changes to Initial Startup Test Program



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Site-Specific Aspects

Sections

14.0, “Verification Programs”

14.1, “Specific Information to be Included in Preliminary/Final Safety Analysis”

Appendix 14B, “Design Acceptance Criteria ITAAC Closure”

These sections are IBR with no departures or supplements.



14.2 Initial Plant Test Program

- ❑ **Site-specific program consistent with MUAP-08009**
 - **Test review group is subcommittee of SORC for initial startup testing**
 - **Test procedures reviewed by MHI/MNES engineering, Testing, Operations, Maintenance, QA, Licensing as a minimum**
 - **Test personnel meet ANSI/ANS-3.1**
 - **Non-supervisory test engineers meet ASME NQA-1-1994, Appendix 2A-1**
- ❑ **Approved test procedures available for NRC 60 days before use**



14.2 Initial Plant Test Program (cont'd)

- Before initial fuel load, first-plant-only and prototype tests are performed or justification is provided that results are applicable a subsequent plant and are not repeated**
- Schedule for pre-op test procedures sent to NRC 1 year before corresponding pre-op tests begin**
- Schedule for startup test procedures sent to NRC 1 year before initial fuel load**
- Event-based schedule for each major testing phase sent to NRC 6 months before pre-op testing begins**



14.2 Initial Plant Test Program (cont'd)

Site-specific individual pre-op test descriptions

- UHS System
- UHS ESW Pump House Ventilation System



14.3 ITAAC

- ITAAC schedule will be sent to NRC per 10 CFR 52.99**
- Piping stress analysis, environmental fatigue analysis, LBB analysis, and pipe break hazard analysis will be completed to support closure of piping design DAC**
- ITAAC for site-specific electrical interfaces with the offsite power system correspond with Tier 1 Section 3.2 and are in COLA Part 10**
- ITAAC for site-specific systems, site-specific portions of plant systems, EP, and security hardware are in COLA Part 10**
- DCD Section 14.3 provides site-specific selection criteria and methodology for EP and physical security ITAAC**



Acronyms

- ❑ **COL** Combined License
- ❑ **COLA** Combined license application
- ❑ **DAC** Design acceptance criteria
- ❑ **DCD** Design Control Document
- ❑ **EP** Emergency Plan
- ❑ **ESW** essential service water
- ❑ **FSAR** Final Safety Analysis Report
- ❑ **HVAC** Heating, ventilation, and air-conditioning
- ❑ **IBR** Incorporated by reference
- ❑ **ITP** Initial Test Program
- ❑ **ITAAC** Inspection, tests, analyses, and acceptance criteria
- ❑ **LBB** Leak before break
- ❑ **MHI** Mitsubishi Heavy Industries
- ❑ **MNES** Mitsubishi Nuclear Energy Systems
- ❑ **SORC** Safety Oversight Review Committee
- ❑ **S/U** Startup
- ❑ **UHS** Ultimate heat sink



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Questions or Discussion?



Presentation to the ACRS Subcommittee

**Comanche Peak Nuclear Power Plant, Units 3 and 4
Combined License Application Review**

Safety Evaluation Report (SER) with Open Items

Chapter 14: Verification Programs

March 4, 2014

Staff Review Team

- **Mechanical Vendor Inspection Branch**
 - ◆ Yamir Diaz-Castillo– Section 14.2
- **Division of New Reactor Licensing Branch II**
 - ◆ Ngola Otto– Section 14.3
- **Mechanical Engineering Branch**
 - ◆ Ian Tseng – Section 14.3.3
- **Reactor Systems, Nuclear Performance, and Code Review Branch**
 - ◆ John Budzynski – Section 14.3.4 (IBR)

Staff Review Team

- **Instrumentation, Controls, and Electronics Engineering Branch II**
 - ♦ **Dinesh Taneja – Section 14.3.5 (IBR)**
 - ♦ **Khoi Nguyen – Section 14.3.5 (IBR)**
 - ♦ **Joseph Ashcraft – Section 14.3.5 (IBR)**

- **Electrical Engineering Branch**
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- **Balance of Plant and Technical Specifications Branch**
 - ♦ **Tarico Sweat– Section 14.3.7**
 - ♦ **Larry Wheeler – Section 14.2**

- **Radiation Protection and Accident Consequences Branch**
 - ♦ **Ronald LaVera – Section 14.3.8 (IBR), 14.2**
 - ♦ **Stephen Williams – Section 14.3.7**

Staff Review Team

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- **Containment and Ventilation Branch**
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 - ◆ **Syed Haider – Section 14.3.11 (IBR)**
 - ◆ **Clint Ashley – Section 14.3.11 (IBR)**

- **NSIR Reactor Security Licensing Branch**
 - ◆ **Pete Lee – Section 14.3.12**

- **ITAAC and Generic Communications Branch**
 - ◆ **Edmund Kleeh – Section 14.3 & Tier 1**

- **Project Managers**
 - ◆ **Lead PM: Perry Buckberg**
 - ◆ **Chapter PM: Ngola Otto**

Chapter 14 Review Status

SRP Section/Application Section		Number of OI
14.2	Initial Plant Test Program	0
14.3	Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC)	0
14.3.3	ITAAC for Piping Systems and Components	0
14.3.4	ITAAC for Reactor Systems	0
14.3.5	ITAAC for Instrumentation and Control Systems	0
14.3.6	ITAAC for Electrical Systems	0
14.3.7	ITAAC for Plant Systems	0
14.3.8	ITAAC for Radiation Protection	0
14.3.10	ITAAC for Emergency Planning	0
14.3.11	ITAAC for Containment Systems	0
14.3.12	ITAAC for Physical Security Hardware	0
Totals		0

- The SE excludes sections 14.3.2 and 14.3.9, which are still under review and Sections 14.3.4, 14.3.5, 14.3.8, and 14.3.11 are Incorporated by Reference (IBR).

Description of Open Items

- Open Item 1-1 Related to the completion of the US-APWR SER .