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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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US-APWR SUBCOMMITTEE

+ + + + +

TUESDAY

MARCH 4, 2014

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ROCKVILLE, MARYLAND

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

COMMITTEE MEMBERS:

JOHN W. STETKAR, Subcommittee Chairman

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

JOY REMPE, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

DESIGNATED FEDERAL OFFICIAL:

GIRIJA S. SHUKLA

ALSO PRESENT:

EDWIN M. HACKETT, Executive Director, ACRS

PERRY BUCKBERG, NRO

JOHN CONLY, Luminant

TODD EVANS, Luminant

TOM HICKS, MNES

ATSUSHI KUMAKI, MNES

SAM LEE, NRO

KENJI MASHIO, MNES

MASATOSHI NAGAI, MHI

KHOI NGUYEN, NRO

HIROKI NISHIO, MHI

MASANORI ONOZUKA, MNES

NGOLA OTTO, NRO

BOB REIBLE, Luminant

JEFFREY SCHMIDT, NRO

RYAN SPRENGEL, MNES

REBECCA STEINMAN, MNES

RUTH THOMAS*

YUKEN WONG, NRO

DONALD WOODLAN, Luminant

*Present via telephone

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

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

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

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

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

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

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

your comments.

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

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

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

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

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

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

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

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

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

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

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

committed to the US-APWR Design Certification.

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

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

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

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

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

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

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

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

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

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

MR. SPRENGEL: Yes, that's --

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

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

CHAIRMAN STETKAR: Yes.

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

CHAIRMAN STETKAR: Good. Good.

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

CHAIRMAN STETKAR: Right.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

They are supposed to verify interactions

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

DCD Table 14.2-1 includes 115 preoperational tests. Tests abstracts for these tests are provided in DCD Subsection 14.2.12.1. The preoperational tests include manual and automatic operation of systems and components and alternate, or secondary modes of control and operation, demonstration of inspected 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 productive devices and testing of system vibration, expansion and restraint.

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

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

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

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

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

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

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

CHAIRMAN STETKAR: Rebecca.

MS. STEINMAN: Yes?

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

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

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

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

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

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

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

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

MS. STEINMAN: Correct.

CHAIRMAN STETKAR: But I'm somewhat more

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

MS. STEINMAN: Okay. Hiroki Nishio?

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

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

MR. NISHIO: Yes.

CHAIRMAN STETKAR: I'm going to have --

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

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: -- things you --

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

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

Let's see if we can get through Section

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

MS. STEINMAN: Okay.

CHAIRMAN STETKAR: -- certain questions on specific testing.

MS. STEINMAN: All right.

MEMBER SCHULTZ: But --

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

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

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

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

MEMBER SCHULTZ: Is it the level of

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

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

MEMBER SCHULTZ: All right.

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

MEMBER SCHULTZ: No, and maybe --

MS. STEINMAN: -- process are?

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

(Simultaneous speaking.)

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

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

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

MEMBER SCHULTZ: You don't have to --

(Simultaneous speaking.)

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

MR. HICKS: Yes.

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

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

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

The final slide that we have for the

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

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

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

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

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

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

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

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

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

MS. STEINMAN: Correct.

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

characteristics.

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

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

CHAIRMAN STETKAR: It does.

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

(Simultaneous speaking.)

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

MS. STEINMAN: Okay.

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

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

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

CHAIRMAN STETKAR: Yes.

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

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

MS. STEINMAN: Right.

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

MS. STEINMAN: Right.

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

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

asking and that's what --

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

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

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

MR. HICKS: Sure.

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

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

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

there's a low flow trip reactor trip signal.

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

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

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

MR. HICKS: Right.

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

MR. HICKS: Okay.

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

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

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

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

CHAIRMAN STETKAR: 2.4.5.1 of Tier 1?

MR. HICKS: Yes.

CHAIRMAN STETKAR: So it's an ITAAC.

MS. STEINMAN: It's in the ITAAC.

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

MS. STEINMAN: Look at ITAAC 8f.

CHAIRMAN STETKAR: ITAAC, which?

MS. STEINMAN: 8f.

CHAIRMAN STETKAR: 8f, like Frank?

MS. STEINMAN: That is correct.

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

CHAIRMAN STETKAR: Thank you.

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

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

CHAIRMAN STETKAR: Thank you. Yes, as a

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

MS. STEINMAN: Right.

CHAIRMAN STETKAR: Settle up that one.

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

CHAIRMAN STETKAR: That's --

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

CHAIRMAN STETKAR: In --

MR. HICKS: Some of these in ITAAC --

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

MR. HICKS: Yes.

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

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

CHAIRMAN STETKAR: Yes, and that's --

MR. HICKS: Yes.

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

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

CHAIRMAN STETKAR: Okay.

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

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

MR. HICKS: Okay.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MS. STEINMAN: Right.

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

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

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

MS. STEINMAN: Right.

CHAIRMAN STETKAR: -- this is pretty small.

MS. STEINMAN: Yes, this is --

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

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

CHAIRMAN STETKAR: Yes. Yes.

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

CHAIRMAN STETKAR: Yes.

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

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

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

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

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

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

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

CHAIRMAN STETKAR: What?

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

to simulate it --

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

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

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

MR. HICKS: Right.

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

MS. STEINMAN: Right.

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

MEMBER SCHULTZ: Or just testing the

assumptions of the calculations. Right.

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

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

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

CHAIRMAN STETKAR: That's exactly right.

MR. SPRENGEL: Yes.

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

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

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

CHAIRMAN STETKAR: Right.

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

CHAIRMAN STETKAR: Right.

MR. SPRENGEL: -- desired function.

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

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

MR. HICKS: Okay.

MS. STEINMAN: Okay, we understand. Now

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

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

MS. STEINMAN: Right.

CHAIRMAN STETKAR: You know.

MS. STEINMAN: Right.

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

MS. STEINMAN: Correct.

CHAIRMAN STETKAR: -- or something.

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

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

CHAIRMAN STETKAR: It's not an easy way

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

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

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

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

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

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

MS. STEINMAN: Right.

MR. HICKS: Okay.

MS. STEINMAN: I understand your feedback.

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

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

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

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

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

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

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

CHAIRMAN STETKAR: Yes, because --

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

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

MS. STEINMAN: Right.

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

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

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

mentioned a couple of tests that had questions about that.

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

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

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

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

Test method says that the function to

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

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

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

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

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

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

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

CHAIRMAN STETKAR: Okay.

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

CHAIRMAN STETKAR: Okay, good.

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

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

MS. STEINMAN: Okay.

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

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

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

MS. STEINMAN: Real time. Yes, sure.

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

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

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

subsystems.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MS. STEINMAN: Okay.

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

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

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

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

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

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

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

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

MEMBER BROWN: Okay. The preoperational

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

MR. HICKS: Okay.

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

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

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

MR. HICKS: Okay.

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

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

MS. STEINMAN: Procedures.

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

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

does that properly?

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

MR. HICKS: Well MHI writes the tests.

MEMBER BROWN: The specific procedure --

MR. HICKS: MHI writes the tests --

MEMBER BROWN: Right.

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

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

MR. HICKS: MHI has done the action --

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

calibration check itself.

MR. HICKS: We can --

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

MR. HICKS: Right.

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

That was the only --

MR. HICKS: Yes, and --

MEMBER BROWN: -- one I could --

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

(Simultaneous speaking.)

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

MR. HICKS: I would suggest --

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

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

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

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

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

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

MR. HICKS: No, it's not.

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

MS. STEINMAN: Yes, not the level of

detail that you were discussing.

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

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

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

It was the communication one way communication from the unit bus to the station bus and you all included some --- there's some changes to the DCD and to the TO1 information, to specify how that's going to be done with the data diode hardware-based analog type, as opposed to 128 gigabit fancy algorithms, I'm being facetious with that, the last part of it, but types of security algorithms.

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

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

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

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

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

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

(Simultaneous speaking.)

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

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

MS. STEINMAN: RAI, okay.

MEMBER BROWN: -- but it was a

supplemental, answers to ACRS Member questions --

MS. STEINMAN: Okay.

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

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

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

MEMBER BROWN: No, I understand that.

MS. STEINMAN: -- the DCD.

MEMBER BROWN: I understand that.

MS. STEINMAN: Okay.

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

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

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

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

MS. STEINMAN: Right.

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

MEMBER BROWN: Yes.

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

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

MS. STEINMAN: Absolutely. Absolutely.

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

MS. STEINMAN: Right.

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

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

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

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

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

CHAIRMAN STETKAR: Added a test.

MS. STEINMAN: -- to verify the --

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

All right, that was all I had, John.

MS. STEINMAN: Okay.

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

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

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

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

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

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

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

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

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

associated SSC.

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

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

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

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

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

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

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

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

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

systems engineering and the section with human factors engineering.

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

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

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

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

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

regulations are to be included in Tier 1.

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

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

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

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

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

particularly significant to the top level requirements for Tier 1.

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

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

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

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

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

cross-reference in this aspect.

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

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

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

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

(Simultaneous speaking.)

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

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

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

MEMBER REMPE: So what is the type of sensor?

MR. NISHIO: The transmitter.

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

MR. NISHIO: Displacement.

MEMBER REMPE: Is it like a DP cell?

MR. HICKS: Yes it is.

MEMBER REMPE: Okay.

MR. NISHIO: Yes, ma'am.

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

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

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

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

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

MEMBER BROWN: Is that a PDF at Page 255?

MR. HICKS: It is.

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

Chapter 19 for you guys.

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

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

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

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

How do they trigger the CSS --

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

MEMBER BROWN: Still on Page 55?

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

MR. HICKS: Okay.

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

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

MEMBER BROWN: Okay.

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

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

MEMBER REMPE: This is about --

MEMBER BROWN: It should start CSS/RHRS.

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

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

MS. STEINMAN: We found it.

MR. HICKS: Okay.

MS. STEINMAN: Okay.

MEMBER REMPE: Thank you.

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

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

MR. HICKS: Yes.

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

MS. STEINMAN: Right.

MEMBER REMPE: But I quit pulling the

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

MS. STEINMAN: Correct.

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

MS. STEINMAN: Right.

MEMBER REMPE: -- based on that discussion.

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

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

MS. STEINMAN: Right.

MEMBER REMPE: Yes.

MS. STEINMAN: Okay.

MEMBER REMPE: Thanks.

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

MEMBER REMPE: Thanks.

CHAIRMAN STETKAR: Any more questions on this slide?

All right.

MS. STEINMAN: All right so our next topic

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MS. STEINMAN: Yes.

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

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

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

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

MEMBER BLEY: Fair enough.

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

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

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

MEMBER BROWN: Little?

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

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

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

MR. OTTO: Good afternoon. My name is

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

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

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

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

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

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

MR. NGUYEN: Yes, I can.

(Simultaneous speaking.)

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

MEMBER BLEY: Yes.

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

MEMBER BLEY: Okay.

MR. NGUYEN: -- review.

(Simultaneous speaking.)

MEMBER BLEY: Good. Thanks.

MEMBER SCHULTZ: So it appears to be responsive --

MR. NGUYEN: Yes.

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

MR. NGUYEN: Right.

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

(Simultaneous speaking.)

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

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

MEMBER BLEY: An additional ITAAC?

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

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

MEMBER BLEY: Okay.

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

MEMBER BLEY: Okay.

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

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

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

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

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

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

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

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

MR. OTTO: Okay.

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

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

MR. OTTO: Okay.

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

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

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

MR. OTTO: Okay, thank you.

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

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

MR. WONG: This is Yuken Wong from

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

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

MR. WONG: Correct.

CHAIRMAN STETKAR: Okay.

MR. WONG: Okay.

CHAIRMAN STETKAR: Okay.

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

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

CHAIRMAN STETKAR: Well, what I mean --

MEMBER BROWN: That's why --

(Simultaneous speaking.)

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

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

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

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

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

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

CHAIRMAN STETKAR: That's right.

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

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

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

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

CHAIRMAN STETKAR: Okay.

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

CHAIRMAN STETKAR: Okay. So from my

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

MR. WONG: Correct.

CHAIRMAN STETKAR: Okay, thank you.

MR. WONG: Okay.

CHAIRMAN STETKAR: He says 3.9.2 of the DCD?

MR. WONG: Right.

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

MR. WONG: Possibly.

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

MR. WONG: Correct.

MEMBER SCHULTZ: Thank you.

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

Thank you, that helps. And with that,

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

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

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

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

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

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

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

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

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

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

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

schedules and testing programs.

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

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

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

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

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

MR. WOODLAN: It's just a slightly

larger --

CHAIRMAN STETKAR: -- the license conditions --

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

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

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

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

(Simultaneous speaking.)

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

CHAIRMAN STETKAR: That's --

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. REIBLE: Yes. Continuing on with the initial plant test program. 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.

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

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

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

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

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

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

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

CHAIRMAN STETKAR: Yes.

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

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

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

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

verification.

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

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

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

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

CHAIRMAN STETKAR: Yes, I mean --

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

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

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

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

MR. WOODLAN: Okay.

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

MR. WOODLAN: Okay.

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

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

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

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

MR. WOODLAN: Yes.

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

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

CHAIRMAN STETKAR: And that's --

(Simultaneous speaking.)

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

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

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

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

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

MR. WOODLAN: Yes.

CHAIRMAN STETKAR: -- was used in those?

MR. WOODLAN: Okay. I understand. Sure.

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

ITAAC for site-specific electrical interfaces with the offsite power system correspond with the Tier 1 Section 3.2 and are in the 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. Next slide. That's it. That concludes my presentation.

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

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

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

No? Thank you.

MR. WOODLAN: Thank you.

MR. REIBLE: Thank you.

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

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

MR. WOODLAN: Yes, you smart one.

CHAIRMAN STETKAR: That's the way.

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

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

Ngola.

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

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

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

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

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

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

testing schedules.

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

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

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

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

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

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

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

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

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

MR. OTTO: Okay.

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

requirements there. I have on the test plan submittals.

MR. OTTO: Okay.

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

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

MR. OTTO: Okay.

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

MR. OTTO: Okay. Thank you.

CHAIRMAN STETKAR: Thanks, Steve.

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

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

CHAIRMAN STETKAR: 4.4-5, okay.

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

CHAIRMAN STETKAR: 2.4.4-5.

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

CHAIRMAN STETKAR: Okay.

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

CHAIRMAN STETKAR: And the flow co, that's

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

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

CHAIRMAN STETKAR: Okay. Thank you.

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

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

MS. STEINMAN: That is correct.

CHAIRMAN STETKAR: Okay.

MS. STEINMAN: It is an ITAAC.

CHAIRMAN STETKAR: Okay. It is an ITAAC?

MS. STEINMAN: That is correct.

CHAIRMAN STETKAR: Okay. Thank you.

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

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

CHAIRMAN STETKAR: I need a note about that one.

MS. STEINMAN: Okay.

CHAIRMAN STETKAR: I'm not sure.

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

CHAIRMAN STETKAR: Yes, give me the number.

MS. STEINMAN: 14.2.12.2.4.11.

CHAIRMAN STETKAR: Yes, .2.4.11.

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

CHAIRMAN STETKAR: I remember looking at that, 2.4.11?

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

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

CHAIRMAN STETKAR: Take a look at, let's

see, any locations that contain safety related equipment.

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

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

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

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

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

CHAIRMAN STETKAR: No.

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

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

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

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

MR. HICKS: Right.

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

MR. HICKS: Yes, okay.

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

MR. HICKS: Yes, okay.

MR. SPRENGEL: Okay, and beyond that I

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

CHAIRMAN STETKAR: Yes, that's fine.

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

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

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

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

CHAIRMAN STETKAR: Steam generator vibration?

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

CHAIRMAN STETKAR: Yes.

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

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

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

MR. SPRENGEL: Right.

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

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

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

MR. SPRENGEL: Okay.

CHAIRMAN STETKAR: -- acceptance.

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

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

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

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

MEMBER BROWN: Why they accepted your exception?

CHAIRMAN STETKAR: Yes. Right.

MR. SPRENGEL: Okay, so that was helpful.

CHAIRMAN STETKAR: So that's --

MR. SPRENGEL: Yes.

CHAIRMAN STETKAR: -- you know, personal.

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

CHAIRMAN STETKAR: Yes.

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

CHAIRMAN STETKAR: That will be fine.

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

MR. SPRENGEL: Thank you.

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

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

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

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

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

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

CHAIRMAN STETKAR: Did you say flood level measurements?

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

CHAIRMAN STETKAR: Ruth.

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

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

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

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

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

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

used.

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

MS. THOMAS: It will? That will help.

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

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

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

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

CHAIRMAN STETKAR: Okay.

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

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

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

CHAIRMAN STETKAR: Right.

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

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

MS. THOMAS: Well terrific.

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

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

CHAIRMAN STETKAR: Yes, and Girija --

MS. THOMAS: Okay.

CHAIRMAN STETKAR: It'll take a few days.

MS. THOMAS: Yes.

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

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

MR. SHUKLA: Okay.

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

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

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

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

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

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

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

MEMBER BROWN: Yes, I --

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

MEMBER BROWN: Not a problem.

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

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

CHAIRMAN STETKAR: Yes.

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

from that standpoint.

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

MEMBER BROWN: Right.

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

MEMBER BROWN: That's right.

CHAIRMAN STETKAR: And of course --

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

CHAIRMAN STETKAR: Right.

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

CHAIRMAN STETKAR: Good. Dr. Bley.

MEMBER BLEY: No, nothing more.

CHAIRMAN STETKAR: Thank you. Dr. Schultz?

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

CHAIRMAN STETKAR: Thank you.

MEMBER BROWN: Let me speak for Joyce,

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

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

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

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

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

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	piping 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	1. Sufficient evidence to demonstrate that the use of O-VDUs enhance the performance of the safety system 2. 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

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Chapter 14 Review Status

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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

U.S.NRC
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- 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).

LUMINANT GENERATION COMPANY

Comanche Peak Nuclear Power Plant, Units 3 and 4

ACRS US-APWR Subcommittee

FSAR Chapter 14 –
Verification Programs

March 4, 2014

Luminant

US-APWR

MNES
MITSUBISHI NUCLEAR ENERGY SYSTEMS, INC.

Agenda

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

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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)

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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.

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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

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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**

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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

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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?

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

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

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Chapter 14 Review Status

U.S.NRC
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SRP Section/Application Section		Number of OI
14.2	Initial Plant Test Program	0
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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

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