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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

US-APWR SUBCOMMITTEE MEETING

OPEN SESSION

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MONDAY

NOVEMBER 29, 2010

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ROCKVILLE, MARYLAND

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The Advisory Committee met, at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., John W. Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

DENNIS C. BLEY, Member

CHARLES H. BROWN, Member

MICHAEL T. RYAN, Member

WILLIAM J. SHACK, Member

NRC STAFF PRESENT:

NEIL COLEMAN, Designated Federal Official

DAN BARSS, NSIR/DPR/NRLB

OM CHOPRA, NRO

JEFF CIOCCO, NRO

ROBERT FITZPATRICK, NRO

HOSSEIN HAMZEHEE, NRO

PETER LEE, NSIR

TANIA MARTINEZ NAVEDO, NRO

NGOLA OTTO, NRO

EDWARD ROBINSON, NSIR

MICHAEL TAKACS, NRO

PRESENT FROM MITSUBISHI:

RICHARD A. BARNES, MNES

RUSS BYWATER, MNES

HIROSHI HAMAMOTO, MNES

SHINJI KAWANAGO, MNES

KENJI MASHIO, MNES

SHINJI NIIDA, MHI

RON REYNOLDS, MNES

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

C-O-N-T-E-N-T-S (CONTINUED)

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

8:31 a.m.

CHAIRMAN STETKAR: Everybody's attention. The meeting will now come to order.

This is a meeting of the ACRS US-APWR Subcommittee. I'm John Stetkar, Chairman of the Subcommittee.

Other ACRS members in attendance are Bill Shack and Dennis Bley. Neil Coleman of the ACRS staff is the Designated Federal Official for this meeting.

The purpose of our meeting is for the Subcommittee to review Chapters 8 and 13 of the NRC Safety Evaluation with Open Items associated with the US-APWR Design Control Document.

Chapter 8 addresses electric power systems, and Chapter 13 covers conduct of operations. Chapter 8 examines onsite and offsite power systems and handling of station blackout conditions. Chapter 13 covers broad topics that include plant procedures, training, organization, and operational program implementation and security.

The Subcommittee will gather information, analyze relevant issues and facts, and will formulate proposed positions and actions, as appropriate, for the full Committee to deliberate.

The rules for participation in today's meeting have been announced in the notice of this meeting previously published in The Federal Register.

Later today, there will be an opportunity for stakeholder comments. We have received no additional written comments or requests for time to make oral statements from members of the public regarding today's meeting. We have received no requests for people to participate via a bridge phone line regarding today's meeting.

A transcript of the meeting is being kept and will be made available, as stated in The Federal Register notice. Therefore, we will request the participants in the meeting use the microphones located throughout the meeting room when addressing the Subcommittee. Participants should first identify themselves and speak with sufficient clarity and volume so they may be readily heard.

We will now proceed with the meeting and the presentations by the NRC staff and Mitsubishi Industries.

Before we start, I have three or four small items that I would like to mention.

The first item is that the staff provided the Subcommittee with a preliminary version of the

Safety Evaluation Report about a month ago. Don't hold me to the date. It was roughly 30 days ago, according to our normal requirements.

We have received an updated version of that Safety Evaluation Report a week ago, and it is a much shorter timeframe than what we like to have.

I don't know whether other Subcommittee members, all of you in attendance here, have had an opportunity to look at the updated version of the SER. When the staff comes up, what I would appreciate it if you do is, please, please highlight any substantive distances between the two documents because I am not sure when all of the members had an opportunity to look at the particular documents and whether they had the opportunity to kind of do a cross-check between the two. So, I would appreciate it if you would do that.

We also received from the staff, again about a week ago, an updated revision of Mitsubishi's top technical report on the gas turbine generator qualifications. Because of the late date of that document, and because I anticipate reasonable interest among the Subcommittee members of issues in that topic, what we have decided to do is postpone our discussion of that technical report until our February

Subcommittee meeting. We have a Subcommittee meeting right now tentatively scheduled for February 23rd to cover chapters 8 and 13, I believe, for the COL applicant.

So, we will be revisiting issues, site-specific issues, for the electric power systems for the COL applicant, and I want to cover the technical report at that time. That will give the members an opportunity to study the latest revision.

That doesn't mean we can't discuss gas turbine generators today, but if the discussion extends into issues of reliability or the qualifications, I would like to postpone those discussions until that February meeting.

The final item that I would like to mention is that what we're going to do -- this is administrative and technical -- we are going to initiate what we have been calling an action items list that has worked pretty well for some of the other design center subcommittees.

What the action items list is, it is primarily an internal list for the Subcommittee to note substantive questions that arise during our meetings. It provides a vehicle for communication among the Subcommittee, the staff, and the applicant, so that we are sure to have all of our questions answered.

Mitsubishi has been wonderful in terms of getting us timely answers and very detailed answers to questions that come up in the Subcommittee meetings. I expect they will continue to do that.

This is, as I said, more for our internal use, so that as the proceedings go on through the next several months we have the ability to revisit that action item list, make sure that if items have not been closed, that we see progress and have reasonable assurance that, by the time we visit the Final SER with No Open Items, that at least all of the questions that we have raised internally have been closed out.

So, what we will do at the end of the day is try to highlight items that will be added to that action item list. Then, Neil, as he prepares the meeting minutes may edit and add items or refine items and things like that. So, I just wanted to alert all of you that we will be starting that semi-formal process.

And with that, I guess --

MR. HAMZEHEE: I am going to say a few words.

CHAIRMAN STETKAR: Okay. I will turn the

meeting over to Hossein Hamzehee then.

MR. HAMZEHEE: Thank you.

Good morning. I am Hossein Hamzehee, the Chief of the US-APWR Projects Branch. We are here today to present, as John mentioned, the results of the staff's Safety Evaluation with Open Items for Chapter 8 and Chapter 13. Chapter 8 covers electrical power systems, and Chapter 13, conduct of operations.

And I want to remind the ACRS Subcommittee members that we do not intend to talk about physical security of Chapter 13, but, rather, the rest of that chapter. As you notice on the agenda, we talk about electric power in the morning, which should definitely take most of the morning, and then Chapter 13 in the afternoon. We don't expect to have a long presentation for Chapter 13. So, most likely, we will be done before four o'clock.

CHAIRMAN STETKAR: Yes, I have the utmost confidence that we will finish before the scheduled completion time.

By the way, Hossein, if questions do come up this afternoon that tread into the area of physical security or sensitive issues, I am going to rely on the staff to alert us to that fact.

MR. HAMZEHEE: Yes, we will do that.

CHAIRMAN STETKAR: Okay. Great. Thank you.

MR. HAMZEHEE: And we have our key staff members here from projects and technical branches that will cover these area.

With that, I will turn it to Neil.

MR. COLEMAN: We're ready to proceed.

MR. BARNES: Good morning.

I'm Richard Barnes. I'm a principal electrical engineer for Mitsubishi Nuclear Energy Systems.

This is Shinji Kawanago. He's our Senior Vice President of Licensing and Engineering for Mitsubishi Nuclear Energy Services, or sometimes called MNES.

This is Shinji Niida-san. He is a principal electrical engineer for the US-APWR Project with Mitsubishi Heavy Industries out of Japan.

MR. KAWANAGO: May I have one question?

MR. BARNES: Yes, you may.

MR. KAWANAGO: May I have one question? We understand now we have now sent a revised technical report on the gas turbine generator, and you want to talk later.

CHAIRMAN STETKAR: Yes.

MR. KAWANAGO: But just on today's presentation still includes several information on the gas turbine --

CHAIRMAN STETKAR: Let's see how it goes. Make the presentation. We may decide to skip parts of the presentation, depending on the topic.

MR. KAWANAGO: Okay.

CHAIRMAN STETKAR: I realize we cannot keep the gas turbine generators out of the discussion of the electric power system, obviously. What I do want to do is postpone discussions of issues that are more relevant specifically to that technical report.

The technical report tends to concentrate on issues of reliability of the gas turbines, qualifications of the gas turbines, some of that data I think used to justify the reliability.

MR. KAWANAGO: Okay.

CHAIRMAN STETKAR: So, discussions in those areas I think we will probably try to skip over in today's meeting. Certainly, anything about the basic design of the gas turbines, how they operate, starting, loading, you know that certainly is relevant to today's discussion.

MR. KAWANAGO: So, just that we proceed and --

CHAIRMAN STETKAR: Just as we proceed. I just don't want to waste your time presenting a lot of material that you will have to present again in February. So, keep an eye on that.

MR. KAWANAGO: Okay. Thank you.

MR. BARNES: That's okay.

Let's go ahead.

Basically, we will go over what Chapter 8 consists of. The title of the chapter is essentially electric power. It talks about -- if we can go to the next slide -- it goes through a brief introduction in Section 1. The DCD document also contains a description of the offsite power interface and how the US-APWR will interface with offsite power at the various sites.

There is a section on onsite power, which is pretty much broken into two, AC and DC. And then, the last section that we will go over today is the station blackout.

Basic high-level design features, we have two sources of offsite power to the unit. One is supplied by the unit auxiliary transformers that essentially backfeed through the main export transformer of the plant. Then, we directly connect reserve auxiliary transformers to the transmission switchyard.

Both of these circuits, they are independent of each other. They are physically separated from each other. And either one is fully capable of supplying all the power needs for normal operations, as well as design-basis event response, and comply with all the GDCs that are associated with it.

There was a major RAI, which we will discuss later, that came from the staff that dealt with the supply power and grid stability and some of those issues. We don't go into a lot of detail with that, but we have I think pretty much resolved that one. Okay.

This is a simple one line of the medium-voltage power distribution.

I could stand up and point.

You have to --

CHAIRMAN STETKAR: Use your pointer, your mouse. Use the mouse because you have to stay near a microphone for the transcript.

MR. BARNES: Oh, okay. Well, hand me the mouse. Hand me the mouse. I think it's on a long cord. There we go.

CHAIRMAN STETKAR: Richard, also be

careful. Those microphones are really, really sensitive. So, if you hit them, your recorder gets explosions in her ears.

MR. BARNES: Then, I'm in trouble, right?

CHAIRMAN STETKAR: Yes. Yes, you are.

(Laughter.)

MR. BARNES: The transmission system, this is the main export transformer for the facility. It is made up of three single-phase transformers which jump the unit voltage up to the grid voltage.

Then, there is an isophase bus that connects the four-unit auxiliary transformers. There's a generator load break switch, and then this is the main generator for the facility.

All the Class 1E buses, which are the ones down here shown in blue, are normally aligned up to these reserve auxiliary transformers here that are fully rated, and they tie directly into the facility or the utilities switchyard.

There are these two buses over here, which are 138 buses. They run the larger motors, circulating pumps, reactor coolant pumps, those kinds of things.

Predominantly, the plant distribution is all to 6.9-kV level. It utilizes voltages down into

480.

These are the four --

MEMBER BLEY: If you move it, it pops back up.

MR. BARNES: If you move it, it pops back up?

MEMBER SHACK: Yes, it goes to sleep.

MR. BARNES: It goes to sleep.

These blue are the four channels of the safety system. The US-APWR has four-train engineered safeguard systems that are completely independent and physically separated from each other.

These two, P1 and P2, are some primary buses that really, they're called permanent buses because these are the buses that we hook the AAC machines into. These over here are just simply the non-safety-related turbine building and auxiliary power buses for the plant.

CHAIRMAN STETKAR: Richard, before you go from that, are P1 and P2 normally powered from the RATs or the UATs?

MR. BARNES: They are normally aligned to the unit auxiliary transformers.

CHAIRMAN STETKAR: Okay. The volting, as I went through the DCD, seemed to be leaning in that direction. However, the DCD Rev. 2 is not consistent. It seems, it appears to me that at sometime the buses were originally powered from the RATs --

MR. BARNES: I think the original --

CHAIRMAN STETKAR: -- and a design change was made. But there are a few sections in the DCD that still discuss, when you talk about bus transfers, there are transfers of those buses from the RATs to the UATs.

MR. BARNES: Okay.

CHAIRMAN STETKAR: So, I just wanted to make sure I understood how the system was designed. I'm assuming that those discrepancies will be caught in the next update to the --

MR. KAWANAGO: Sure, and we got an RAI from the NRC and staff, and we changed that design.

CHAIRMAN STETKAR: Okay. Most of the information seems to be pretty clear. I just wanted to make sure.

MR. BARNES: We'll check to make sure that it is consistent.

Normal alignment is as it says here. The Class 1E buses, which are in blue, are normally aligned up to the reserve auxiliary transformers as a preferred source. The non-Class 1E or non-safety-related plant buses are normally aligned up to the unit auxiliary transformers as their preferred normal source.

Now the buses can be transferred from one source to another when the unit trips and those kinds of things in order to maintain operations. But the safety buses are isolated.

Some of the major design features that we have is we have four-train Class 1E AC electrical power distribution. Each train has its own combustion gas turbine as an emergency power source.

We can do online maintenance. We can take a complete train out of service and still have a single failure on another train that is in service and still maintain the plant in a safe condition. In other words, we can shut down with any two of the four AC emergency buses that we have, the Class 1E buses.

CHAIRMAN STETKAR: Richard, you haven't been before the Subcommittee --

MR. BARNES: No, I have not.

CHAIRMAN STETKAR: -- in the past. You'll find that we are not shy about interrupting your presentation and heading you off down small little paths that you never dreamed you would be headed down.

(Laughter.)

MR. BARNES: Well, that's fine. That's why I'm here.

CHAIRMAN STETKAR: And you also have to accommodate us a little bit, that if we raise a question you plan to discuss something later in your presentation, let us know and we will hold off on it.

MR. BARNES: Okay.

CHAIRMAN STETKAR: But I had a couple of questions. Are you going to come back and revisit the connections from offsite power to the onsite buses later in your presentation?

MR. BARNES: Later in the presentation, what we do is we bring up a series of what we call measure RAIs, which are questions from the staff.

CHAIRMAN STETKAR: Okay.

MR. BARNES: And then, we go through those and, yes, one of those has to do with it. Okay?

CHAIRMAN STETKAR: Okay. Okay. I'll save my question until then. Thanks.

MR. BARNES: Okay. I'm willing to go free-flow here.

CHAIRMAN STETKAR: Well, it tends to be the presentations organize the discussion, but you will find that we are not at all shy about interrupting.

MR. BARNES: Well, don't feel --

CHAIRMAN STETKAR: And by the way, I need to get this. For the record, Charles Brown has joined us. So, we now have his presence.

MEMBER BROWN: Thank you for highlighting my lateness.

(Laughter.)

CHAIRMAN STETKAR: Since you're sensitive, he's been here for a few minutes.

MEMBER BROWN: I almost forgot my donut because of it, but now I'm aligned with the stars.

CHAIRMAN STETKAR: All right.

MR. BARNES: The non-safety-related loads are electrically separated and isolated from the Class 1E safety loads. Then, the required non-safety-related are normally supplied through AAC in the cases of a LOOP. If we do have a station blackout, we align the AAC machines to provide power to bring the unit in scope with the station blackout, bringing to a safety shutdown state.

Okay. This is some of the gas turbine generator numbers. I will go through this very briefly.

We do propose to put in a gas turbine generator in the US-APWR design. It is a first-time application in the United States.

The one we have chosen is continuously rated at 450 kW -- or excuse me -- 4500 kW. It's got a short-time rating of 4.9 MVA or MW. That is the engine part.

The generator is rated at 4500 kW, 4625 kVA, and .8 power factor, 6900-volt, three-phase, 60 hertz.

The start time required, the accident analysis, and the basis for the accident analysis is we need these machines to start, at least two of the four machines we have to start within less than 100 seconds and accept load. A limiting load case is a LOCA.

MEMBER BLEY: Okay. You said this will be the first application in the U.S. Worldwide, has there been much experience with these machines?

MR. BARNES: There has been some experience in Japan.

MR. KAWANAGO: Actually, in Japan, Tokai there is one in a nuclear power plant. Actually, it is not a commercial operations plant. It is a nuclear plant for the experiment -- is it correct? -- and at that one actually they use the gas turbine generator, other emergency power supply system.

MEMBER BLEY: Okay. Essentially, the same machines? The same size?

MR. KAWANAGO: It's actually --

MR. NIIDA: The same machines --

MR. KAWANAGO: The same machines, the same product.

MR. NIIDA: -- but different capacity.

MEMBER BROWN: Different what?

MR. NIIDA: Capacity.

MEMBER BROWN: Capacity? Okay. Thank you.

MR. KAWANAGO: It is smaller.

MEMBER BROWN: These look like they are still the same as -- you all made a presentation to the Subcommittee a year and a half ago up in Pittsburgh, I believe. Maybe it's -- I don't remember. But this looks familiar. This looks like it's the same. Nothing has changed from what I remember.

MR. KAWANAGO: Nothing has changed.

MEMBER BROWN: Am I correct?

CHAIRMAN STETKAR: Charlie, you missed. You were away.

MEMBER BROWN: I know. I just wanted to know --

CHAIRMAN STETKAR: I'll emphasize this. You were late.

(Laughter.)

You missed the introductory. MHI has submitted an updated revision --

MEMBER BROWN: Oh, okay.

CHAIRMAN STETKAR: -- of the technical report for the gas turbines. That only came in -- or I don't know when they submitted it to the staff. We received it from the staff a week ago, which is too short for our timeframe.

MEMBER BROWN: I agree with that.

CHAIRMAN STETKAR: So, what we have decided to do is we have postponed discussions about that technical report, which gets into reliability of the gas turbines, the design, qualifications of the gas turbines, until our February Subcommittee meeting.

MEMBER BROWN: That's fine. I just wanted to know. This looked like it was the same. I went back through the slides that we got a year and a half ago quickly, just to try to calibrate it, and not knowing what we were going to cover. So, that's fine. If it is the same, that's fine.

MR. CIOCCO: Could I add one thing, please? Jeff Ciocco, NRC staff.

We did just want to point out, John, that we did present back on May 21st, 2009, the GTG.

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: MHI gave you an informational briefing, which did go through the qualifications plan.

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: It was just recently updated, I think within about two or three weeks ago. So, we sent you the most recent.

But to answer your member, it is similar-type information that we presented back on -- it was May 21st/22nd, 2009 --

CHAIRMAN STETKAR: Yes. Okay.

MR. CIOCCO: -- on the gas turbine generator.

CHAIRMAN STETKAR: Thanks.

MR. KAWANAGO: Also, though, we want to clarify, actually, the contents of the revised point on the technical report, basically, is a specification of the gas turbine generator. We don't change anything. And that is why it is basically consistent with our presentation.

CHAIRMAN STETKAR: Okay. Thank you.

MR. KAWANAGO: And just we change and now modify a little bit to meet the ISG, draft ISG.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: So, no, we don't change anything on that.

CHAIRMAN STETKAR: Okay. Well, we'll take a look at that. It sounds like it may not require an awful lot of time in a Subcommittee meeting. We will take a look at those changes, and I know at the time of the last meeting we had some questions about some of the reliability, the sources of the data.

MEMBER BLEY: I haven't had a chance to look at that.

CHAIRMAN STETKAR: And I haven't, either. But that is on our agenda for February.

Are you going to come back to the gas turbine generators?

MR. BARNES: Yes.

CHAIRMAN STETKAR: Okay. Fine.

MR. BARNES: We have a couple few more slides here, and then we can talk as you would like.

CHAIRMAN STETKAR: Proceed.

MR. BARNES: We are doing qualification testing on this machine. We are in the process of doing that now.

These are the ruling documents:

Regulatory Guide 1.9, IEEE 387, which relates more to diesels. There are some items there that we are using. We are trying to stick with it as close as we can.

The staff has been working on Interim Staff Guidance 21, which is a draft on the changes that needed to be made in order to adequately look at a gas turbine-driven standby machine.

MEMBER BLEY: I don't think we have seen that as yet. I guess we would like to. That's to the staff.

MR. BARNES: Oh, that is to the staff?

MEMBER BLEY: We would like to see where that's headed.

MR. BARNES: And in the subject that has been put off to February, which is the technical report, the qualification test plan for --

MEMBER BLEY: If I could, it would be nice to see that before that February meeting.

MR. HAMZEHEE: Yes. We will make sure you get a copy of it.

MEMBER BLEY: Thank you.

MEMBER SHACK: Go back to that for a second.

I was curious. To demonstrate 95/95, you have been doing 150 start tests.

CHAIRMAN STETKAR: We'll get into that in February.

MEMBER SHACK: But just let me ask a simple question. This is intended to meet the URD document that you have 98 percent reliability? The 150 sort of matches right up with that.

If you don't know it off the top of your head, don't worry about it.

MR. KAWANAGO: Basically, our strategy now is initial test needed to meet, now two types of initial tests. We needed to completely meet to the IEEE 387, and that one required 100 times test. So, in addition, we see in the notes, the URD requirement, we see the Regulatory Guide 1.1335.

We wrote, and I'll explain later, not today I believe, if necessary, though, we would explain, though --

MEMBER SHACK: Well, 150 will certainly do it, yes. Thank you.

MR. BARNES: This is the test data that we have taken during the start and load acceptance test part of the IEEE standard. The machine is performing well. It is very consistent in starting. It is almost independent of starting temperature. It does not have a keep-warm system on here.

This data has got approximately 83 starts in it. What you see is our main start time is 28 seconds. This is up to and ready to accept load, the generator breaker closed.

Our standard deviation is three-quarters of a second.

MEMBER BLEY: And this is up to its design load?

MR. BARNES: Well, this is a start and load acceptance test, which requires us to block-load it at 50 percent. So, we have to put a load on it greater than 50 percent on each test. You know, these times are when the breaker closes and it is ready to load.

CHAIRMAN STETKAR: This is the output breaker closing time, is when you stop it?

MR. KAWANAGO: It is basically the starting time and always calibrated by using no load.

MR. BARNES: Right, no load. And then, the load is added, and the load is added then 100 percent. During this test, that load is a 50 percent or greater block load.

CHAIRMAN STETKAR: Okay.

MR. BARNES: Okay? We have done some

transient response tests on the machine as part of the load acceptance. Here's the results. The machine recovers voltage very, very quickly. It is astonishing. And it recovers frequency pretty quick. We are seeing 100 percent load additions that we recover in voltage in less than a second.

MEMBER BLEY: When it says 100 percent load addition, that's not 100 percent load? All at one time?

MR. BARNES: Yes, at one time.

MEMBER BLEY: No kidding?

MR. BARNES: It is a block load at 100 percent.

And then, the following number right behind that is the load rejection where we reject the load to make sure it doesn't --

MEMBER BLEY: Yes. Yes, that one is easier.

MR. BARNES: There again, voltage and frequency recover astonishingly quickly with this machine.

Here again, these are the major RAIs that we had in Section 8.3, which is -- you know, there we talk about the redundancy of the onsite power system -- I think that 8.3 is wrong -- and the reliability of the gas turbine generator, which are some of the subjects that, I think that reliability one has been deferred until February.

CHAIRMAN STETKAR: Yes.

MR. BARNES: Now we are kind of blazing right through here. We are getting into -- I mean, first, rather, do we have any questions on the onsite power system?

CHAIRMAN STETKAR: Yes, several, actually. I'm trying to look ahead in your presentation. Let me just launch into it.

MR. BARNES: We do talk more about it.

CHAIRMAN STETKAR: In the Section 8.2.1.2 of the DCD, where you discuss the offsite power system, there is a bit of discussion about connections from the offsite power system to the onsite power system. There's a figure, 8.2-1, in the DCD that shows a simplified layout of the main transformers and the buildings. It shows what seemed to be some underground duct banks. I had some questions about those underground ducts.

Since the RATs are the normal power supply to the four safety buses, are the cables from the -- how are the cables from the RATs into the plant configured? Are these run in separate duct banks to try to separate the supplies to the safety buses from the non-safety buses? Are there separate duct banks for each of the safety buses? Do you have any information about that?

MR. BARNES: Well, the non-safety are carried by the unit auxiliary transformer.

CHAIRMAN STETKAR: Well, but there are tables for the RATs that also can supply the non-safety buses also.

MR. BARNES: I think we will try to find it. I mean the four trains are physically separated in the plant. I know they eventually have to get to one of those two transformers. At least we have, it's like the A and B channels I believe come off one, and the C and D channels come off the other one. So, there's that separation, and I think there is some guarded separation between them.

CHAIRMAN STETKAR: But I kind of hung up on a statement that said in the DCD, "Cables associated with the normal preferred and alternate preferred circuits are physically separated from each other to minimize common-cause failure. Even supposing that these circuits share a common underground duct bank...."

That statement about even supposing that they share a common underground duct bank led me to the question regarding separation and whether they are just physically spatially separated within a common duct bank or whether there are actual barriers between them.

MR. KAWANAGO: Basically, in our design, and we clearly state it in the DCD, basically, though we have physical separation. Even if so, we use the same duct, physically it always separates completely.

CHAIRMAN STETKAR: You mean with a barrier, a barrier in between?

MR. KAWANAGO: Yes.

CHAIRMAN STETKAR: Okay. Yes, that wasn't clear.

In that same section, we have had discussions lately in other of our Subcommittee on plant licensing renewal regarding susceptibility of underground cables to damage because of moisture intrusion into underground duct banks and things like that.

I noted that in the DCD you have made the commitments to monitor the duct banks and to look, to institute a testing program for medium-voltage cables. Recent guidance has extended the scope of those concerns to include cables, not only the medium-voltage cables above 2 kV, but cables down to about 400 volts AC.

Are you aware of that, and do you plan to also protect underground cables in terms of trying to control moisture intrusion and institute cable testing programs for those low-voltage cables?

MR. BARNES: Yes, that is the cable-monitoring issue. We have seen questions on that from some of the COLA applicants.

We need good duct banks, true, but --

MR. KAWANAGO: I think we had better check on that and answer later.

MR. BARNES: I mean we are aware of the issue, and we are aware that it is a concern and that the threshold has been lowered. We are also aware of some Maintenance Rule work and some other stuff that we are doing with some of the COLA applicants.

CHAIRMAN STETKAR: Do you plan to address that in a revision to the DCD or are you going to let the COLA applicants address that scope? Or is it too early to answer?

MR. BARNES: Well, I mean, you know, that's a funny thing. That is exactly where we are right now.

CHAIRMAN STETKAR: Okay, okay.

MR. BARNES: We have an active question, an RAI from the staff on the cable-monitoring program.

CHAIRMAN STETKAR: Okay.

MR. BARNES: And we are trying to decide, do we do a DCD, do we do COLA?

CHAIRMAN STETKAR: Okay.

MR. BARNES: And, you know, we are just in that and we need more time.

MR. KAWANAGO: So, now we have got an RAI from the NRC staff on that issue. But especially the focus on that medium voltage --

CHAIRMAN STETKAR: Yes, I didn't see anything --

MR. KAWANAGO: Well, I think it is an open item on this Chapter.

CHAIRMAN STETKAR: Is there? Okay. Well, maybe we will hear from the staff more about that later.

It has only come up rather recently. There's a revision to some guidance for the plant license renewal process that is formalizing that extension of scope down into the lower voltage --

MR. KAWANAGO: Low voltage.

CHAIRMAN STETKAR: -- at 400 volts and above.

MR. KAWANAGO: Yes.

CHAIRMAN STETKAR: I just wanted to get some feedback from you whether you were --

MR. KAWANAGO: Okay.

CHAIRMAN STETKAR: You are obviously aware of the issue, but it hasn't yet been --

MR. KAWANAGO: Yes, but today our DCD is planned only for the medium voltage.

CHAIRMAN STETKAR: That's right. Okay. Okay, thank you.

MEMBER BROWN: I had just one question on a philosophy. When you look at your diagram, I notice there's four reserve auxiliary transformers, and you stated, made the statement, that the safety buses are lined up to the reserve to the RATs. And when you look at that, like two of them go to RAT 3 and two of them go to RAT 4.

Was there a reason for not having each division connected to a separate transformer on its own as opposed to now a transformer goes out and I lose two safety divisions, other than I've got the back-up emergency power systems for them? They just seemed to be a little bit more inconsistent with having individual basic power going to each division from a separate transformer from the transmission system. Is there a philosophical basis for doing that?

MR. KAWANAGO: I'm sorry, I cannot catch up well on it. Could you ask again?

MEMBER BROWN: Let's go back to the picture, go back to the one line.

MR. KAWANAGO: No, it's a total --

MEMBER BROWN: You did the same thing with the non-safety buses as well.

MR. BARNES: Right. We've got two transformers here. So, basically, A and B are connected to --

MEMBER BROWN: RAT 3?

MR. BARNES: RAT 3, and C and D are connected to 4.

He is basically saying, why did we select two, and why didn't we have a separate transformer, a separate reserve auxiliary transformer for each safety bus?

I'm sorry, I don't know a lot of the design history behind it. I know what it is.

I think it is a matter of physical space on the yard and where they are located.

MEMBER BROWN: Well, it is just a matter of running cables. That is all it is.

CHAIRMAN STETKAR: Well, it could also be a matter of buying more transformers.

MEMBER BROWN: No, you've got four.

CHAIRMAN STETKAR: Yes, but the other ones are actually rated 138 kV on the secondary side.

MR. BARNES: These two are 138.

MR. KAWANAGO: Basically, may I insert to your question?

MEMBER BROWN: Oh, I see. Okay. I didn't pick up. I'm sorry. Just a second and you can answer me. I didn't pick up on the smaller rating, but actually they are smaller-rated, 3 and 4 are already smaller-rated.

CHAIRMAN STETKAR: They are all called RATs, but 1 and 2 are higher power ratings and their secondary voltages are different. So, you just can't run cables over to them.

MEMBER BROWN: Yes, I didn't see that.

CHAIRMAN STETKAR: You need to install two more transformers.

MEMBER BROWN: Oh, okay. Yes, yes, yes, I've got that. Fine. All right.

CHAIRMAN STETKAR: Actually, four because you need two more UATs.

MR. KAWANAGO: Actually, our basic

philosophy is, basically, our safety-related bus should be power-feeded by the RAT.

And regarding a connection inside of the RAT, RAT 3 or RAT 4, it is a result of the calculation of the time off the load. We needed to keep -- how do you say it? -- the balance, keep the balance of the total time of the capacity of the load.

Can you understand?

MEMBER BROWN: No, I understood you.

MR. KAWANAGO: Yes.

MEMBER BROWN: I'm not sure I agree with the idea, but I understood what you said.

MR. KAWANAGO: We don't say that these are philosophy. They are just based on the calculation of the time out, and we loaded an A and B to the RAT 3 and, yes --

MEMBER BROWN: Well, I understand that part. It was just a matter of using more -- I think we can go on past this. I think one answer popped out in terms of the ratings. So, you would have to do something else and add more transformers if you were going to do that. I will think about that one.

CHAIRMAN STETKAR: Richard, in your presentation, are you starting to get into the station blackout issues now?

MR. BARNES: Yes.

CHAIRMAN STETKAR: I want to interrupt you substantially then.

There are several statements in the DCD that say the onsite electric power system consists of four independent divisions and that any two of those divisions will provide all safe shutdown capability.

The divisions aren't completely symmetric. Two of the divisions, A and D, contain the charging pumps, and only those two, and two of the divisions, B and C, contain only the motor-driven emergency feedwater pumps. So, they are not all completely symmetric divisions.

I found one statement in the DCD, if you will give me a chance to find it here again. It was discussing maintenance alignments, but the statement says, "When all four trains are available, operability of at least one train of trains A or D, in conjunction with one of the three remaining trains, is required to mitigate a design-basis event condition."

That tells me that I need A or D and at least one other. So, for example, let me ask a specific question, and you may not have the answer.

Suppose I only have trains B and C. Now not in a maintenance alignment, just a normal plant alignment with everything energized.

MR. BARNES: You've got B and C.

CHAIRMAN STETKAR: And I only have B and C. Some combination of failures takes out A and D. Can I then mitigate every design-basis event with only power at B and C?

MR. KAWANAGO: Our answer is yes.

CHAIRMAN STETKAR: Okay. That was a quick answer. I have not looked at all of the design-basis accident analyses. For example, if I only have power at B and C, I do not have power to the charging pumps. Do you need the charging pumps to mitigate any design-basis events for this plant?

MR. KAWANAGO: The answer is no. The answer is, no, we don't rely on anything on the charging pump.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: And also, the emergency feeder system, we have the turbine-driven and the motor-driven --

CHAIRMAN STETKAR: I was more concerned about the charging pumps because I know you have the turbine-driven pumps in the emergency feedwater system to take care of those.

But you do not take credit for the

charging pumps for any design --

MR. KAWANAGO: No, no.

CHAIRMAN STETKAR: Okay.

MR. HAMAMOTO: This is Hiroshi Hamamoto, MNES.

For the design-basis event, we don't need two charging pumps, but after that, for the safe shutdown phase, we need to use a charging pump.

CHAIRMAN STETKAR: For makeup?

MR. HAMAMOTO: For a makeup. That is only for the after design basis.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: But only the one pump. Two to go to the safe shutdown.

CHAIRMAN STETKAR: Well, but if you have B and C, you have zero pumps, so it doesn't make any difference whether you need one or two.

MR. HAMAMOTO: But a piston, we can subsist a safe shutdown by using the safety injection pump feed. So, basically, we don't need two charging pumps for the --

CHAIRMAN STETKAR: But the concern with the charging pumps is boration to get you to cold shutdown, boration concentration.

MR. HAMAMOTO: Yes, but the duct is a

normal shutdown phase. For the design-basis boration, we use a safety injection pump feed.

CHAIRMAN STETKAR: Okay.

MR. HAMAMOTO: And if -- necessary we install the emergency letdown line from the direct to the hot direct. Extract the water to the refueling -- refueling pit. So, that we can feed and breed boration. It is, of course, a safety-related boration.

CHAIRMAN STETKAR: Okay. Thank you.

MR. BARNES: Let's see. I think we had some discussion on one of these major RAIs coming up --

CHAIRMAN STETKAR: Oh, do you? Okay.

MR. BARNES: -- about those two buses.

CHAIRMAN STETKAR: Okay. Great. Then, I will let you continue with your presentation. I have some other questions, but maybe we can pick those up at the end because they tend to be a bit disjointed.

MR. BARNES: Going into the station blackout, you know, the design features of the US-APWR, we have two alternate AC machines. They are available in the event of an SBO when all offsite power and the emergency power sources are not available. And they are capable of bringing the unit to a safe shutdown condition and maintaining them in that status.

The design basis for that, we have diverse alternate AC machines to minimize common-mode failures.

The non-Class 1E AAC machine, it is a packaged gas turbine generator set connected at 6900-volt level, normally to the permanent, what we call a permanent bus. We realign the AAC to any of the four Class 1E buses in response to a station blackout, and the AAC supplies are all the safe-shut lives during the coping period of eight hours. So, with one AAC machine, we can essentially set up and maintain safe shutdown under blackout conditions.

CHAIRMAN STETKAR: That slide characterized the AAC gas turbine generators as diverse. I think I read somewhere that you have made a commitment to supply those AAC gas turbine generators from a different vendor compared to the safety-related gas turbine generators. Is that correct?

MR. KAWANAGO: Yes, and our current plans are we will use a different manufacturer.

CHAIRMAN STETKAR: Okay.

MR. BARNES: At this point, we are ready

to kind of go into what we consider the major RAIs that we got from the staff, the major questions, and kind of a high-level response to those.

The first one we got was really on Section 8.2. It has to do with the redundancy of and the requirements for the onsite power system. This is essentially the question regards SECY 91-078, and that advanced reactor shouldn't have any intervening non-safety buses between offsite power and the onsite power system.

We are missing some slides here.

MEMBER SHACK: We have them in the electronic copy.

CHAIRMAN STETKAR: That is one way to keep the time in check.

(Laughter.)

Do you want a copy of the ones we have?

(Laughter.)

MR. BARNES: Maybe we need to end the show and find our slides, I guess.

MR. KAWANAGO: Just use this one and explain --

CHAIRMAN STETKAR: You can go back to the PDF version, which is on there also.

MR. BARNES: It's basically the next slide was supposed to be -- I still wonder where those went to. Well, gee.

Anyway, at one time, this got back -- and we have discussed this briefly before -- but regarding these two, these permanent plant buses, they were normally aligned to the reserve auxiliary transformers. In other words, they got their power through this feed. And that was their normal mode of operations.

Their alternate power supply was the power source was the UATs. And that raised the issue about these non-safety buses being connected essentially at this point to safety-related buses. And consequently, these buses would be subject to transients associated with this one: starting large motors, major faults, those.

Our response was we looked at that and essentially changed the power source for these two buses to be normally the unit auxiliary transformers, and that effectively isolated all the safety buses over on these two transformers.

So, they are somewhat independent. Well, they are independent from each other. They are separated from each other because these transformers are physically located with protection away from these. So, I think we resolved that particular issue.

Oh, they're back. Blame it on the operator.

(Laughter.)

But, as you see, essentially, it is that same slide; we have just colored in the breakers here. These are the normal sources for the bus. And there we go.

So, if we lose unit auxiliary power, otherwise, up here or the generator trips in that thing, then the non-safety-related bus, even if one fails, then the power still maintains from here to the safety buses, and lack of transients and stuff -- they continue to receive a stable power source through their reserve auxiliary transformers.

CHAIRMAN STETKAR: Richard, again, in later slides, will you discuss the operation of the system during a loss of offsite power and then a progression into a station blackout? Or is it appropriate with this drawing?

MR. BARNES: Well, we can. You know, these slides don't really talk about that.

CHAIRMAN STETKAR: Okay.

MR. BARNES: But I'm sure we have enough people here to go into that, if we need to.

CHAIRMAN STETKAR: If they don't, we're doing fine on time. So, we don't need to rush through this.

MR. BARNES: Okay.

CHAIRMAN STETKAR: If we have a loss of offsite power, the AAC gas turbines automatically supply the two permanent buses, is that correct?

MR. BARNES: That's true.

CHAIRMAN STETKAR: Okay. And are they automatically loaded also? I didn't get a chance, or if I did, I forgot -- what types of loads are connected to those permanent buses? In other words, you have highlighted those buses. There's some need that those buses have a reliable standby source of power.

So, I am curious about what loads are supplied from those buses.

MR. KAWANAGO: Basically, it's a non-safety-related load, and especially to keep the integrity of the turbine site. And, for example, the cooling water pump for the turbine acts on the component, and so on.

CHAIRMAN STETKAR: Okay.

MR. BARNES: It is secondary-side critical components.

CHAIRMAN STETKAR: Okay. Now are you going to talk later in the SBO slides at all about reconfiguring the system during a station blackout or should we talk about that?

MR. BARNES: We probably need to talk about that later. I mean we can talk about it now, but --

CHAIRMAN STETKAR: You have other slides --

MR. BARNES: Yes, there is a couple of other topics on the offsite power system.

CHAIRMAN STETKAR: Okay. Well, I'll save that.

MR. BARNES: Then, we will get into that.

CHAIRMAN STETKAR: Okay. Thank you.

MR. BARNES: This goes to the redundancy. That was one of the questions. Any two of the four trains is adequate to meet the electrical load. These are the actual concerns.

"And with any two of the trains, can you achieve the emergency power system safety function with one train out of service?" It is essentially goes back to the question you were asking before about the A and the D buses.

Here is basically what the configuration is. This is one side. This is duplicated on the other side with the C and D. But we have train A, train B, and then we have this bus called A1, which is essentially almost like a swing bus between the two.

During normal, if the A generator -- it really boils down to the A gas turbine generator. If it is operable, this is the alignment. This A1 bus is connected up to the train A and double-isolated and stays there. So, if there is an event, and then the A train is available and responds normally, and the A1 bus continues to be powered.

Now, under certain maintenance alignments, when we either do an online maintenance or we are taking the A gas turbine out, and this same thing applies to the D gas turbine, we manually open these and close these. And therefore, we align this A1 bus to the B train. Now that is during a maintenance interval.

Those manual switching operations are all done prior to taking the A generator out of service or taking the D generator out of service. Once those actions are taken, the safety system responds, can respond to any event as if the A train was working. It would use two of the other channels.

But this A1 bus and the D1 bus would

continue to be powered through one of the associated separate channels. And we only need one, either the A1 bus or the D1 bus, to do the same shutdown.

CHAIRMAN STETKAR: A couple of questions. Are those A1 and D1 buses immediately loaded? In other words, are they always connected to the safety bus? They are not part of the load sequencing?

MR. BARNES: I don't believe so. The load sequencing is all done at the 6900-volt level, is it not?

MR. KAWANAGO: Your question is --

CHAIRMAN STETKAR: My question is, if the load sequencing is at the 6900-volt level, is the 6900-volt circuit breaker that supplies, eventually supplies, the transformer that eventually supplies the A1 bus and the D1 bus, is that circuit breaker part of the load sequencing or is it all normally connected and loaded immediately when the --

MR. KAWANAGO: It is a different --

CHAIRMAN STETKAR: GTG.

MR. KAWANAGO: This and the circuit breaker are always closed.

CHAIRMAN STETKAR: It's always closed? Okay.

MR. KAWANAGO: Just this one is closed in the case of the --

CHAIRMAN STETKAR: Okay. The reason I asked the question is questions about linkages between different divisions of load sequencing for circuit breakers.

What particular loads are supplied from those A1 and D1 buses that they require this special treatment?

MR. KAWANAGO: It is a very, very typical load on this A1 or B1. It is an isolation box. It is in the containment vessel there is an isolation box, and the inside and the outside, it's only the two, the A train and the B train. We can't have the full train for the isolation box.

CHAIRMAN STETKAR: Okay.

MEMBER BLEY: So, they are all containment isolation valves?

MR. KAWANAGO: Sure.

CHAIRMAN STETKAR: I noticed the spent fuel pit, the spent fuel pool pumps are also off the major load centers, but the motor control centers down below are all containment isolation valves.

MR. KAWANAGO: Isolation valves. And we really want to have the full train system completely, but the isolation box should be hard with only the two trains. So, we needed to have this path.

CHAIRMAN STETKAR: Okay.

MR. BARNES: And there again, it is not like we have to do a manual action immediately after an event or, you know, during an event. It is a pre-stage maintenance switching operation.

CHAIRMAN STETKAR: Those breakers are all interlocked, so that you cannot parallel -- can you parallel --

MR. KAWANAGO: No. No, no.

CHAIRMAN STETKAR: -- the bus?

MR. BARNES: No.

CHAIRMAN STETKAR: It's a dead bus transfer?

MR. BARNES: These are interlocked.

CHAIRMAN STETKAR: And they're interlocked? Okay.

MR. BARNES: Well, I mean these two are not, but I think these two --

CHAIRMAN STETKAR: Someplace there's interlocks.

(Laughter.)

MR. BARNES: And they are double-isolated, you know, so you have got breakers on both sides.

CHAIRMAN STETKAR: Yes. Okay.

MR. BARNES: Okay. We talked about the two out of the four trains before. Now here we talk just a little bit -- this is one of the staff's concerns, was the gas turbine reliability. And most of this discussion is deferred off into February, but we have just a few key points here.

We see the reliability, based on manufacturer's operating experience, when compared to the diesel engines used now, the same probability approach. The gas turbine has a higher reliability. We are doing initial type-testing. You know, we've got to have a 95 percent reliability with a 95 percent confidence.

We are going to use some of the test data or all the test data, I guess, from the initial type tests that we're conducting now to verify the reliability. As you said, we do think doing 150 starts without a failure is an adequate sample size to get us to a 95 percent confidence level, which is where we want to be.

Now, then, I guess at this point we are really getting into station blackout. This is a question that we got from the staff on operations in coping with station blackout.

The US-APWR design can do, under station blackout conditions, can do without -- you know, we don't need power from the AAC machine for a period of 30 minutes after an SBO occurs.

CHAIRMAN STETKAR: Thirty or 60?

MR. BARNES: Sixty. Excuse me. Sixty minutes.

And, then, that raises these questions we got from the staff. CO leakage capability, decay heat, compressed air. On a very high level, the plant is kept at a hot shutdown condition during that 60 minutes. So, RCS shrinkage due to temperature is not a concern.

The emergency feedwater pit is big enough to remove decay heat for the period of eight hours, the entire coping duration.

This particular plant design does not have air-operated valves. All of the motor-operated control valves needed to keep the unit during station blackout are DC valves that are powered from the batteries. So, we don't have a compressed air or service air concern.

Class 1A batteries are designed to supply all those loads for a period of two hours without charging. And all the equipment located in these critical areas, the EFW turbine room, the EFW pump turbine area where the turbine pump is, that corridor, the main steam water piping area and the battery rooms are all designed to maintain operable without ventilation for that period of time.

CHAIRMAN STETKAR: Before you change the slide here, I had a couple of questions.

There was a statement that the reactor coolant pump seal can maintain its integrity for at least one hour without water cooling, as part of the justification for that 60 minutes. What's the basis for that claim?

MR. HAMAMOTO: This is Hiroshi Hamamoto.

After 60 minutes, we use seal injection cooling. But between one hour, the time test is no cooling can appear to keep the boundary.

We received the three RAI from NRC on how to keep this boundary integrated between the one hour. Our answer is, first, we stopped the No. 1 seal leak off line, and after that, leakage is only from the No. 2 seal. No. 2 seal design basis is designed, the reactor coolant design pressure and ,also, temperature is a little bit lower.

But, basically, the No. 2 seal can keep the pressure boundary, and the design leakage rate pointed to TPME is kept during the one hour. That is our basic design.

Do you understand?

CHAIRMAN STETKAR: Yes. Yes, I do.

I am not familiar with the details of the seal package design on these pumps. Our Subcommittee hasn't received that information yet.

But have you run any tests on your particular pumps at design operating temperature and pressure with isolation of all cooling water to the seals to confirm that, indeed, there is no thermal damage to the seal package that would increase leakage rates substantially? We are all aware of the problems that other pump manufacturers have had with failures of seals due to elastomers in the seal packages and things like that. But I was curious whether you have done actually any tests to support that.

MR. HAMAMOTO: The proposed design for US-APWR, I mean US-APWR design is stop the No. 1 seal leak off line. Such a design basis, we don't have a test for the station blackout.

But, as I explained, in such a case only the No. 2 seal and the seal leak off line is -- reactor coolant boundary. And I explained No. 2 seal, the design pressure is the reactor coolant pressure design basis, that we need to -- calculation item is only to the temperature rise during the station blackout.

We calculate, assume the station blackout condition. We confirm in such a case No. 2 seal temperature does not go up to the No. 2 seal design temperature. So that, we believe that we can use No. 2 seal leak of really .2 gpm count peak used for the station blackout case.

That is our explanation for the RAI to the NRC. But that is an open item that remains. The NRC, they requested us --

MEMBER BLEY: What is the design temperature you mentioned of the No. 2 seal?

MR. HAMAMOTO: No. 2 seal is around 260 Fahrenheit.

MEMBER BLEY: It must be C.

MR. HAMAMOTO: That temperature is lower than the reactor coolant pressure boundary design temperature, but the normal, we can't use a steam injection on the boundary. Some are -- double; some are barrier.

That staff point of a station blackout is such a construct, in such a condition that seal temperatures are lower than the design temperature.

I'm sorry. A normal design operation

number seal temperature, I don't explain that.

CHAIRMAN STETKAR: No, it would be pretty low.

MR. HAMAMOTO: But after the station blackout occurs, and after one hour's temperatures, we calculated.

CHAIRMAN STETKAR: So you have done a calculation, a heat-up calculation accounting for the initial temperature --

MR. HAMAMOTO: Yes.

CHAIRMAN STETKAR: -- of the seal package?

MR. KAWANAGO: Yes, we calculated, and --

CHAIRMAN STETKAR: You still show that it is less than whatever it is, 260?

MR. KAWANAGO: Yes, design temperature of the shield.

MR. HAMAMOTO: Yes, now that item we need to discuss with the NRC. Okay?

CHAIRMAN STETKAR: Yes.

MR. HAMAMOTO: And that is an open item.

CHAIRMAN STETKAR: Okay. We will probably raise this issue again when we talk about the pumps.

Just put it on our list, Neil.

I understand what you are doing.

The second question I had about this

initial one hour is that there's also a statement that says, "The temperature of the Class 1E electrical room and INC room will not reach 50 degrees C within one hour, even without HVAC."

The last bullet on this slide mentions specific rooms, but it does not mention the electrical rooms. So, I was curious about, what is the basis for the statement that the temperature in the electrical rooms will not reach 50 degrees C?

And in particular, there are electrical rooms that contain the inverters that supply the motor control centers for the critical motor-operated valves. I would assume that those inverters are fairly large heat sources. I have no idea what the configuration of the rooms are. We don't have any of that information.

But could you tell us what analyses you have to confirm that not only the bulk room temperatures in the electrical rooms and the INC rooms, but also the internal cabinet temperatures remain within acceptable conditions for that one hour?

MR. KAWANAGO: It is basically, and we are so sorry, this is actually in the presentation it dropped the name of the electrical. And it is a room, but a different result. We have already calculated the temperature not only for this one, but also the --

CHAIRMAN STETKAR: You have done heat-up calculations for those rooms?

MR. KAWANAGO: Basically, after the one hour, we needed to use the motor control center and also the medium voltage and the passive pressure system, and two power feeds from the alternate -- power source. So we needed to have the utility of that.

CHAIRMAN STETKAR: Well, but during the first hour, those inverters will be loaded during the first hour, won't they?

MR. KAWANAGO: No.

CHAIRMAN STETKAR: They are supplied from DC power?

MR. KAWANAGO: No, no, no. But my point is, after the one hour, we needed to use again --

CHAIRMAN STETKAR: Yes. Sure. Certainly, they cannot be failed during the first hour.

MR. KAWANAGO: Yes, yes.

CHAIRMAN STETKAR: But my question is, during the first hour there will be load on those inverters because the valves, depending on the event, some of those valves I assume will be operating.

MR. KAWANAGO: It is only there -- the AC power, no. Motor, DC power --

CHAIRMAN STETKAR: There are several AC motor control centers that are fed from inverters from the 125-volt safety DC batteries, and those, I would assume, will have some reasonable load on them during that first hour.

MR. KAWANAGO: Yes, the first hour, but --

CHAIRMAN STETKAR: Which means the inverters are going to be putting out some heat.

MR. KAWANAGO: Yes. And actually -- how do you say it? -- we needed to use those motor control centers because that one is power-feeded by the DC power. The DC power, too, and the inverter, you know, it is a combined inverter and motor -- it is a motor-driven.

So, it is not too much, too big a heat itself because only a short-time operation. However, the different areas there is some heat. And we calculated.

CHAIRMAN STETKAR: Okay, but you are saying you do have heat-up calculations for those rooms under those conditions? I guess we would be interested to see those.

I don't know whether it is in the context of Chapter 8 or whether it is in the context of

Chapter 9. You know, Chapter 9 has all of the ventilation systems, but we would certainly be interested to see the results of those heat-up calculations and what assumptions have been made about initial temperatures, heat loads, things like that.

Can we put that on our list?

MR. BARNES: Yes, that should have been on this list. I mean, this list should have included electrical rooms?

CHAIRMAN STETKAR: Well, the statement certainly is made in the DCD. There was a question; this is a response to an RAI, which is why you highlighted it on this slide, about some specific areas that might have --

MR. BARNES: Well, these are the areas associated with the steam-driven --

CHAIRMAN STETKAR: Yes, yes.

MR. BARNES: -- and the DC --

CHAIRMAN STETKAR: Yes, and they might have steam lines in them, and they would certainly have really measurable heat sources.

But in the DCD there was also the statement that the temperatures in the Class 1E electrical and INC rooms would not exceed 50 degrees C. And that prompted my question about those particular rooms, and not only the bulk room temperature, but, also, have any analyses been performed to look at the internal temperatures within the cabinets?

For example, INC cabinets typically have their own power supplies inside. So, if they are not well-ventilated, for example, the internal cabinet temperature can be a lot higher than the bulk room temperature that you might calculate just adding up the heat sources and whatever heat sinks you are taking credit for.

MR. BARNES: Okay.

CHAIRMAN STETKAR: So, we are interested to hear about that, I think.

MR. KAWANAGO: Basically, if the cabinet has a cooling fan inside of the -- for example, the -- now you are using a host cooling fan.

CHAIRMAN STETKAR: Right.

MR. KAWANAGO: However, those ones, it is the power feeding from the DC power, and they are still using, but --

CHAIRMAN STETKAR: Yes, I mean --

MR. KAWANAGO: But the motor controls in that case, there is no actual result on the cooling fan in such a case. You know, it depends on the environmental condition.

CHAIRMAN STETKAR: Yes. I mean that is just radiating conducted heat transfer away from the motor control center and, also, typically, from -- I don't know what the inverter cabinets look like.

Okay, continue, please.

MR. BARNES: All right. One of the other major RAIs was the overall capability of the AAC power source and how it gets, you know, its various alignment. There are two AAC gas turbine generators. They are normally aligned in power-up permanent buses P1 and P2, which are critical secondary-side loads, non-safety loads, but loads that help protect some of that major equipment in the turbine building. During an SBO event, we need one of those to power the SBO loads by aligning it to one of the safety-related trains.

The regulatory position -- this is, I guess, the NRC's position -- requires it to maintain the plant in a safe shutdown condition. You know, safe shutdown for the US-APWR is hot standby.

We can achieve hot standby condition using one of the AAC gas turbine generators and one train in the Class 1E system. We can go to cold shutdown by aligning the other AAC machine to a second Class 1E train. And that will get us all the way down.

Basically, here is just a summary, a real high overview of the electrical distribution system for plants. We have two independent offsite power sources from the transmission grid. Each one is sufficient to operate the plant at normal or in response to design-basis condition.

The Class 1E power system consists of four 50 percent trains. Any two trains, we can maintain the safety functions of the plant with the power system.

Class 1E, even with the safety system, we can take one channel, one train, out for maintenance, do online maintenance on it, which improves overall plant reliability and those things, and still tolerate a single failure on one of the remaining three trains.

The independency and separation, the Class 1E system complies with the Reg Guides and IEEE standards. The Class 1E gas turbine generator, you know, we will make it comply to Reg Guide 1.9 and the IEEE 387, as it gets modified by the Interim Staff Guidance, which is currently in draft form.

The Class 1E qualifications include some initial type testing. We have done a load endurance test or a capacity test, run the machine for 24 hours, did a load rejection. It performed well.

You saw some of the results from the start and load acceptance testing. It is doing well.

We have yet to do a margin test, but we have every confidence that it will be able to handle the big load, the biggest step inside the load duty cycle.

And they are diverse to minimize common load failures and respond to station blackout.

So, essentially, at this point --

CHAIRMAN STETKAR: Before you leave that --

MR. BARNES: Yes?

CHAIRMAN STETKAR: -- and don't shut down.

MEMBER BLEY: Nice try.

(Laughter.)

I know you need two trains, as you say in your second bullet that you have described, to cover the full set of DBAs. Is it only particular LOCAs that require two? For most of the DBAs, can you get by with just one train or do you need two trains for essentially all of them?

MR. BARNES: Yes, I think you are kind of asking, can we limp home with one train or can we --

MEMBER BLEY: That's it. So, what

accidents and transients can you limp home with one train?

MR. BARNES: Are there certain anticipated operational currencies or certain of the actions outside of the big LOCA, like a small-break LOCA, that we could maybe handle with one train?

MR. KAWANAGO: Okay. It is a beyond the design-basis event, your question.

MEMBER BLEY: Well, not really. Even for all of your Chapter 15 analyses, you did it assuming you have two trains. But my question was --

MR. BARNES: Could we get by with one?

MEMBER BLEY: -- can you get by with one for many of those? So, you can say beyond basis; that's okay, but I'm really asking, do you know which particular accidents need two and which accidents and transients can you get by with just one on?

MR. KAWANAGO: Okay.

MEMBER BLEY: And since they are unsymmetrical, probably it's a very complex answer. So, we don't need to do that right now, if that's where we stand.

MR. KAWANAGO: We needed to confirm. I'm sorry.

MEMBER BLEY: Okay. Fair enough. Maybe

when you get to the PRA, that would be a good place to talk about this.

MR. KAWANAGO: Yes. Yes, and it is maybe the scope of the PRA.

But do we, in terms of today, now it is not a direct answer to your question. However, for example, the PRA is on our condition, and sometimes we just need to avoid core damage in such a case, and we can just rely and use only the one train as a success criteria with the PRA.

So to keep the plant safety, I mean it is on a Chapter 15 basis, we needed to have the two trains. And success criteria of PRAs, sometimes we can use only the one train. That means it significantly contributes and it's increasing plant safety by using a alternate system.

CHAIRMAN STETKAR: Okay. That's enough for now.

Richard, can you go back to one of the drawings that shows the layout of the buses? Any of the -- yes, there you go.

Now let me ask you, put you into a -- well, I want to understand how the system works and the station blackout recovery works. If we have a loss of offsite power, you said normally the AAC GTGs will automatically re-energize buses P1 and P2. And for the sake of argument right now, let me do away with the Class 1E GTGs. So, now we have a nominal station blackout.

Can you tell me how the operators realigned the plant to supply one of the safety buses from the AAC GTG?

MR. BARNES: I think so. I don't have a picture to show it to you, but --

CHAIRMAN STETKAR: Yes, it would help if you had that intermediate bus.

(Pause.)

We can also revisit this later.

I had a couple of questions about the process of transferring the AAC GTG to the safety bus and then the process of realigning the plant when offsite power is restored. So, maybe it might be more efficient for me to ask the questions and you can think about them.

MR. KAWANAGO: I'll try to answer. Basically, this A alternate AC power source can power-supply to not only this P1, but also this A or B. And this B alternate AC power source can power-supply to not only the P2, but also a C or D. Okay?

CHAIRMAN STETKAR: It's just links.

MR. KAWANAGO: Yes. And just between this alternate AC power source and this switch gear, there is an additional connection line and there is a disconnection, a disconnector between here and this -- and here. An operator can handle it by manual and, also, there is a mechanical --

CHAIRMAN STETKAR: I think I read that it said, when you do the transfer -- so, suppose now that let's look at AAC A. AACA A is connected automatically and it is powering loads on P1.

MR. KAWANAGO: P1, yes.

CHAIRMAN STETKAR: When you transfer the supply from AAC A to, let's say, safety bus A --

MR. KAWANAGO: Here or here.

CHAIRMAN STETKAR: Yes, A or B, just select one, B because it's the closest one.

(Laughter.)

MR. KAWANAGO: Okay.

CHAIRMAN STETKAR: It's necessary for the operators to manually remove loads from P1, is that correct?

MR. KAWANAGO: It is actually the disconnector here.

CHAIRMAN STETKAR: So, they will completely disconnect P1? So, they will basically deenergize P1 when they make that transfer?

MR. KAWANAGO: Yes, that's right.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: And completely --

CHAIRMAN STETKAR: Let me make that note because that wasn't clear. That was the first part of the question, because it wasn't clear whether they simply shed loads from P1, opened up the circuit breakers, and left something powered, or whether they simply dropped the whole bus.

MR. KAWANAGO: There are two ideas. The one is connected to here and disconnect several loads. After that, kind of connect from here to there. But our design just is simply disconnect here and connect to the B train, which is a very easy way.

CHAIRMAN STETKAR: That is the easiest way.

Now, if that is the case, then, I'm really confused about a procedure for restoring power to the safety bus from the offsite grid. There's a very simple version of the procedure in Section 8.4.1.4 of the DCD. It lists steps for recovery from station blackout with available offsite source.

And it says that -- it's a very simple five-step procedure -- it says that, "The output of the AAC GTG is adjusted to synchronize with offsite power." Okay, that's good. "If the offsite power AC source from the RAT is available" -- and let's assume that it is the RAT -- "the incoming breaker from the RAT to the 6.9-kV permanent bus is closed, and the AAC GTG governor is adjusted to unload the AAC GTG." And then, the circuit breaker from the AAC GTG to the Class 1E bus disconnect switch is open.

That leaves me a permanent bus powered from offsite power and no AC power at any safety buses. So, I'm really curious now about your station blackout recovery procedure in the Design Control Document because it seems to not recover offsite power to a safety bus.

You may want to go look at that because, if for some reason you left the GTG connected to the permanent bus, I was trying to figure out how it might work. But with the GTG completely disconnected from the permanent bus, the proposed procedure doesn't work at all.

The staff asked a question about that, by the way. So, I am going to ask the staff how come you said that was a good procedure. You might want to be prepared when you come up.

MR. CHOPRA: Om Chopra from the Electrical

Engineering Branch, NRO.

I believe we did not ask that question, but it seems to me, if the GTG is already connected to the emergency bus, and offsite power is available, then the safety bus is already connected to it, because this GTG bus already is providing power to safety loads.

CHAIRMAN STETKAR: Not if it works like any electrical system I have seen. Because when the GTG connects to the bus, there is an interlock that requires both the feed breakers to the bus that have to be open. You don't want to have the GTG parallel, try to pick up the rest of the world necessarily. I think there is an interlock that I read about.

MR. BARNES: Still -- well, okay.

CHAIRMAN STETKAR: The message is here. Look at that station blackout recovery procedure. And the staff did ask a question about station blackout recovery procedures. The question focused on a different topic, but it is in there.

MR. KAWANAGO: Okay. So sorry. And I understand your comment. Basically, this procedure looks like this permanent bus and power feeding. In a station blackout, by using this permanent bus and -- power feeding to the essential bus, it looks like --

CHAIRMAN STETKAR: It almost looks like that way somehow. That is why I got confused about that alignment.

MR. KAWANAGO: Yes. And basically, we changed that design from Rev. 1 to Rev. 2.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: Now we answer to you simply that we disconnected this one and connect it to here.

CHAIRMAN STETKAR: Yes.

MR. KAWANAGO: And we don't rely on this one. But the big ones, design basis, now we use this one.

CHAIRMAN STETKAR: Oh, okay.

MR. KAWANAGO: We are so sorry.

CHAIRMAN STETKAR: Oh, so you actually connected through the selector. Okay.

MR. KAWANAGO: Under Rev. 1 basis, we used it here, and we changed it with time.

CHAIRMAN STETKAR: Okay, yes.

MR. BARNES: And that's what drove that question.

CHAIRMAN STETKAR: Yes. So, you actually said P1 from the GTG and then connected the safety bus to P1.

MR. KAWANAGO: That is something that --

the basis, we change --

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: We needed to revise, and definitely in Rev. 3 we reflected that. So sorry.

CHAIRMAN STETKAR: Okay. No. Okay. That explains how that crept in there. That explains how that crept in there.

MR. BARNES: But those procedure steps or guidelines need to be clarified, I think.

CHAIRMAN STETKAR: Yes, the procedure steps right now don't work.

A few other questions here. There is a discussion of the load sequencing for the design-basis LOOP and LOCA event.

MR. BARNES: Okay.

CHAIRMAN STETKAR: And just keep this.

MR. BARNES: Keep this.

CHAIRMAN STETKAR: Keep this because this is the most important drawing in the world.

(Laughter.)

As I understand, let's assume you have a simultaneous loss of offsite power and a LOCA.

MR. BARNES: Okay.

CHAIRMAN STETKAR: A design-basis event.

MR. BARNES: Yes.

CHAIRMAN STETKAR: Here is my understanding of the sequence of events, and please tell me if I'm wrong because I reconstructed this from a rather long discussion in the DCD and responses to RAIs.

As I understand it, at time T0, when the event occurs, you will have a safeguards actuation; you will have a reactor trip and a turbine trip. However, in this design, the main generator, what I call the output breaker or your generator load break switch remains closed for approximately 15 seconds, as the main turbine coasts down. So that, for the first 15 seconds, the UATs will have power.

At time T0, the ECCS load sequencers start to load equipment on the safety buses, or at least they should start. They don't load equipment until the safety bus has voltage, is that correct?

MR. BARNES: Yes.

CHAIRMAN STETKAR: Okay. At about 0.8 seconds, the Class 1E bus under voltage relays detect loss of voltage because the RATs are de-energized by the LOOP.

Those under-voltage relays will sense voltage available from the UATs, and the Class 1E buses will transfer to the UATs, is that correct?

MR. KAWANAGO: Yes, because of the under-voltage.

CHAIRMAN STETKAR: Okay. And because the UATs still have power. This is approximately 1 second into the event. Is that right?

MR. KAWANAGO: Yes.

CHAIRMAN STETKAR: Okay. The load sequencers now, since they see voltage on the bus, will start to load pumps onto the Class 1E buses. I looked at the load sequencers. I lost my list here, but it's safety injection pumps, component cooling water pumps, essential chilled water pumps, and essential service water pumps are all loaded in the first 15 seconds.

Now, at about 15 seconds, the generator load break switch opens, and that now de-energizes the safety buses and the gas turbine generators, which are started by the signal, but are not loaded. The gas turbine generators will now load onto the safety buses, but you first must strip those loads and restart everything.

So, it's my understanding that, for this design-basis event, each one of those safety-related loads is initially loaded onto the bus, its breaker is closed. Then the breaker is tripped, and then the breaker is closed again when the gas turbine generator loads onto the buses. Is that the correct sequence of events?

MR. KAWANAGO: I understand your point.

CHAIRMAN STETKAR: You understand?

MR. KAWANAGO: Yes, and --

CHAIRMAN STETKAR: You may want to take it away and think about it a little bit. This is a rather unusual design to be requiring those 6.9-kV circuit breakers to be cycling twice, basically, in the time period between whenever they're loaded in the first 15 seconds, then they're tripped before the gas turbine can load onto the bus, and then reloaded again somewhere after about 100 seconds into the event. That is a reasonable cycle on those 6-kV breakers.

If that is the design, I am curious why it is designed that way. I understand why you keep the load break switch closed for 15 seconds, but I am not sure why you keep it closed under these conditions.

So, you may want to think about that. There may not be a quick answer. I just want to make sure, if I have misinterpreted something, I would certainly like to know that. And you can go back through the transcript and get the full sequence.

MR. BARNES: We will sort that out.

CHAIRMAN STETKAR: Take a look at that. It just seemed --

MR. BARNES: It is almost like there is a blocking. We are transferring and then --

CHAIRMAN STETKAR: The problem is that the safety buses see voltage from the UATs. So, they are going over to the UATs rapidly.

MR. BARNES: Right.

CHAIRMAN STETKAR: The load sequencer will then see voltage on the bus. So, it will connect the loads onto that bus. It doesn't care where the power is coming from.

And then, somewhere in the midst of the load sequencing, power goes away.

MR. BARNES: Right.

CHAIRMAN STETKAR: You know, when power goes away, you shed all of the loads from the bus, so you can pick it up from the GTG. And you go back in and sequence them all on again, which is a little bit different.

MR. KAWANAGO: Yes, and I think I understand your question. Actually, the action of the plant system, I think your explanation I believe is correct. But, on the other hand, we needed to think about, in such a case, what is actually the definition of LOOP. I mean the definition of the LOOP is completely loss of the offsite power.

CHAIRMAN STETKAR: Right.

MR. KAWANAGO: But now within 15 seconds, definitely we can use offsite power. So, what is actually the starting point? It is a definition of the LOOP and the LOCA.

CHAIRMAN STETKAR: We are on a design-basis accident analysis space here. So, we have to, for these types of evaluations, we sort of have to follow the rules there. So, I think it is a simultaneous LOOP and LOCA.

MR. KAWANAGO: Yes. So, our understanding is basically that we needed to think about completely loss of the offsite power is a 15-second rate. It's offsite power, now it is gone. It is the main UAT site gone. I'm sorry. I don't know how to say it exactly.

CHAIRMAN STETKAR: It's the high side of the main transformer. Yes, the MHI response is --

MR. KAWANAGO: These lines have gone.

CHAIRMAN STETKAR: Right.

MR. KAWANAGO: But, still, we can rely on it here.

CHAIRMAN STETKAR: Yes.

MR. KAWANAGO: Fifteen seconds or maybe we don't say, but maybe this generator can power-supply continue. I don't know why, but in such a case we still rely on offsite power because this main generator side is still now, we think, is one part of the offsite power. Okay?

And my point is, what is the starting point of the loss of offsite power? Definitely after the 15 seconds. I mean it is a cutoff of this --

CHAIRMAN STETKAR: Well, but I tell people that I have enough difficulty trying to be an engineer; I certainly can't be an attorney.

If, indeed, I do have a safeguards actuation -- let's call it a LOCA -- and a simultaneous loss of the switchyard, so I'm clear about what that is --

MR. KAWANAGO: Yes.

CHAIRMAN STETKAR: If I can get into this double-cycling of the safety load circuit breakers, I want to make sure that, indeed, that is the design and that, indeed, that is an acceptable duty cycle for those 6.9-kV breakers and that it doesn't have a substantial effect on the reliability of the safety systems.

Because we are essentially asking each

circuit breaker to cycle three times within less than about two minutes. It has got to close twice and open once in the interim.

MR. BARNES: It appears to be an unnecessary cycle or two there.

CHAIRMAN STETKAR: You may want to think about it.

MR. BARNES: Yes.

MR. KAWANAGO: Basically, I understand. I'm so sorry, but I want to emphasize again.

Typically, this US-APWR has the capability to follow the completely load rejection. Okay?

CHAIRMAN STETKAR: Right.

MR. KAWANAGO: So, even if we lost site power this side and this side, still, if so, we don't assume the reactor trip. Okay? And we can power-supply to this on our onsite power supply system, okay, by using our main generator.

So, the definition of the complete loss of the offsite power, we needed to assume that here and here and the loss of the main generator. That is one point.

Also, I understand on the duty cycle of the -- it is a switch here. It is on and off and on, and different things that we needed to do.

And alternate power supply system basically is a 40-second starting time, so that we can do that three times within 40 seconds. And in the safety analysis basis it is 100 seconds, and this is still --

CHAIRMAN STETKAR: No. Yes, but the point is, anytime after -- I don't care whether it comes up in 40 seconds or 19 seconds or 100 seconds. Anytime after 15 seconds, if the generator output breaker opens at 15 seconds, you are going to be cycling those 6.9-kV breakers.

Let's table that one for now. It is just a question I have. We will probably put it on our list to examine.

And I only have two other questions. Hopefully, these will be a little more simple. And then we can take a break.

There is a statement in the DCD. It is Section 8.3.1.1.8. It discusses the equipment layout and environmental qualifications of electrical equipment.

And a statement is made. It says, "Piping containing fluids is excluded from the Class 1E electrical distribution equipment rooms."

The Class 1E electrical distribution rooms are cooled by ventilation systems which are, in turn, cooled by the essential chilled water system. My question is, is there a central chilled water piping to the ventilation units in the Class 1E electrical rooms? If so, that statement is a bit misleading because chilled water is a fluid. If the chilled water doesn't go to the ventilation systems in the rooms, then I am not sure how the ventilation system is configured.

We have not looked at Chapter 9, but it raised a question because I knew about the chilled water system. Typically, there are chilled water lines that run to the HVAC units, unless the HVAC units are out in a separate room somehow, which they could be.

MR. BARNES: Well, yes, what that tells me is switch gear rings are not cooled off the central chilled water system; they have their own HVAC. Something cools it.

MR. KAWANAGO: I think it's --

CHAIRMAN STETKAR: I looked at the load list in Chapter 9, and the load list in Chapter 9 for the essential chilled water system says it provides cooling for the Class 1E electrical room air-handling units.

MR. KAWANAGO: Basically, as you said, it is a ventilation system used to chill, and the chill uses essential --

CHAIRMAN STETKAR: Right.

MR. KAWANAGO: If the question is whether, indeed, water actually will go to the ventilation system --

CHAIRMAN STETKAR: Exactly. In the room, yes.

MR. KAWANAGO: But today I needed to check.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: But we don't think that that water directly goes to the ventilation system.

CHAIRMAN STETKAR: Okay.

MR. KAWANAGO: But we will check and we will answer that.

CHAIRMAN STETKAR: Just check. It was a question because it was a very definite statement that said there is basically no fluid lines in those rooms.

And I think that is the last one that I have. Oh, one last question, yes.

This has to do with station blackout recovery. The safety-related DC batteries are rated for two hours, is that correct? The non-safety DC batteries are rated for one hour?

MR. KAWANAGO: Yes, one hour.

CHAIRMAN STETKAR: One hour? What is the power supply, the DC power supply, for operation of circuit breakers out in the switchyard? Is that part of the DCD or is that COL?

MR. BARNES: It's COL, the question --

CHAIRMAN STETKAR: Okay. I will ask the COL applicant. The question I always ask is, what's the time rating of the DC power supplies for the circuit breakers out in the switchyard? Some plants power them from inside the plant. That's why I was asking about DC.

MR. KAWANAGO: Your question is the switch gear in the switchyard?

CHAIRMAN STETKAR: Yes, the question is, for example, if we go into a station blackout, and, indeed, you disconnect the P1 and P2 buses, that means one hour after that point all of my non-Class 1E batteries are dead, if I do not restore some sort of power within one hour, because I'm disconnecting the AAC GTG from the P1 and P2 buses. I think I got that right.

One hour later, I have no non-safety DC power. So, if I then need, after one hour, if I need

DC power to operate circuit breakers out in the switchyard to reconnect power to either the main transformer or the RATs, I should have some confidence that, indeed, I can operate those circuit breakers out there. But if that is all within the COL scope of supply, we will ask the COL about that. Okay.

MR. BARNES: They normally have redundant powers and stuff out there --

CHAIRMAN STETKAR: Yes, yes.

MR. BARNES: -- because those switchyards are important to them, too.

CHAIRMAN STETKAR: I have seen some plants that have actually, as part of the plant design, powered the key circuit breakers from inside the plant as part of their station blackout recovery. So, that is what led me to ask that question.

MR. KAWANAGO: Yes, basically, our definition is of the recovering of the station blackout, for example, here and it is somehow, and we don't specify, but recover the power to here, and we can --

CHAIRMAN STETKAR: Well, everything outside of those arrows is the COL responsibility. Okay.

I don't have any more questions. Do any

of the other members?

MEMBER BLEY: No, most of mine were on the things we will cover in February. But, yes, I have one very simpleminded question.

I am not familiar with the language "permanent buses". Is there any history to that and why they are called permanent buses?

MR. KAWANAGO: Actually, frankly speaking, it is URD, EPRI URD, uses that terminology.

MEMBER BLEY: Oh, do they? Okay.

MR. KAWANAGO: Yes. So, we use the same terminology from the URD.

MEMBER BLEY: Fair enough. Thank you.

CHAIRMAN STETKAR: Anything else?

(No response.)

If that's the case, thank you very, very much for the presentation and for putting up with our questions.

I think you get a flavor that in the Subcommittee meetings we tend to delve into rather obscure technical details in cases, so that regardless of what you come prepared for in your presentation, you will be taken off that path rather quickly.

And again, thank you very much for a good presentation.

And with that, we will recess until 10:45.

(Whereupon, the above-entitled matter went off the record at 10:30 a.m. and resumed at 10:46 a.m.)

CHAIRMAN STETKAR: Okay, we're back in session.

For the record, Mike Ryan has joined us. So we are gradually recovering from the holiday weekend malaise here.

MEMBER RYAN: And airplane schedules.

CHAIRMAN STETKAR: And airline schedules. I won't ask you what kind of search they did. Trust me, I don't want to know.

(Laughter.)

And with that, we will hear from the staff on Chapter 8. Ngola?

MR. OTTO: Good morning, everyone.

I'm Ngola Otto. I'm the Chapter 8 Project Manager for the US-APWR design.

Here is Bob Fitzpatrick and Tania. We are going to be covering the presentation. Basically, I'm going to cover the overview, and Bob and Tania are going to get into more of the detail of the design review for Chapter.

MEMBER BLEY: Can I ask you an overview

question before you even start?

MR. OTTO: Sure.

MEMBER BLEY: I'm just wondering, on all of these design reviews, because of the way we are trying to do them, and you are, the design is changing as we go along. I am just wondering if there is a simple way to put up some flags so we don't spin our wheels.

I don't know when the next revision of the DCD is due. If you have some information about that, maybe you could tell us.

But on a system like this one, it would be, I think, real helpful if you had like a one-page little summary, if that's possible, of things that we know or the designers know have changed. You know, "We have changed the normal power supply for the permanent buses from one source to the other." And a list of those, so we don't chase things unnecessarily.

I don't know if that is possible, but it sure would be helpful in the future, if we could do something like that, you know, an elaborate report; just "The following six things have been changed in the design."

MR. OTTO: From the last DCD revision?

MEMBER BLEY: Well, yes, because we look

at the DCD revision that we have got. If there are things that are known to be changed, to keep us from wasting a fair amount of time chasing down things that don't exist anymore --

CHAIRMAN STETKAR: It's been a real problem with some other designs --

MEMBER BLEY: Yes.

CHAIRMAN STETKAR: -- where DCD revisions, we might not even seen an interim DCD revision. We might see Revision X and then see Z, Z not necessarily being final, not even see the one in between; things were changing so rapidly that the intermediate one just wasn't sent to us.

I hope that won't be the case here, but --

MR. CIOCCO: Jeff Ciocco with the NRC staff.

I understand your question, and I think we can try to do that in our presentations. First and foremost, we hope that it is clear in the Safety Evaluation Report which version we are writing the SE to. So, in this case, it is to Revision 2 of the DCD.

MEMBER BLEY: I didn't state it properly then.

MR. CIOCCO: Okay.

MEMBER BLEY: But it is not just that;

it's you have written it to Revision 2. We are looking at Revision 2, but some things have changed since Revision 2.

MR. CIOCCO: Right.

MEMBER BLEY: And, you know, you do and we do spend some time digging into things. And to have it put on the table and say, "Oh, well, that's no longer the case. We've changed it," it would save an awful lot of time if we just knew what those were.

MR. CIOCCO: You're right.

MEMBER BLEY: You've got to do your review the way you are doing it. We don't have to dig into things that don't exist anymore.

(Laughter.)

CHAIRMAN STETKAR: And the problem is, by the time we see your presentation, we have -- I won't use the word "wasted" -- spent an awful lot of time doing homework on something that --

MR. CIOCCO: I understand. I am just going to follow the evolution and say we write the Safety Evaluation on Revision 2. In the process, as you read through the SE, you are going to read RAIs in which we ask questions. HMI responds to the RAIs, and in those RAI responses Mitsubishi provides DCD change pages, which will then be incorporated into Revision

3, which Mitsubishi at this time is planning in March of 2011.

MEMBER BLEY: Okay. So, it is coming up.

MR. CIOCCO: So, you have DCD Revision 2. You have the RAI questions, the RAI responses, and committed changes to the next revision of the DCD.

In the interim, Mitsubishi provides what we call RAI Tracking Reports, which captures all the changes in that chapter. For this case, Chapter 8, if you looked at the monthly tracking reports, you would see what has been updated in the DCD with the change bar --

CHAIRMAN STETKAR: That might be it because we don't get, nor do we want, all of the RAIs and the RAI responses. That would just be overwhelming.

But if there is a summary --

MR. CIOCCO: There is.

CHAIRMAN STETKAR: -- of that type of tracking, that would help.

MR. CIOCCO: There is, and that's what Mitsubishi does a very good job of providing the updates to the DCD chapter for us. And then, once the next revision comes out, there's no surprises.

CHAIRMAN STETKAR: That would be good.

MR. CIOCCO: We've seen the changes. But, yes, we can certainly do that in the future.

CHAIRMAN STETKAR: When you get the packages prepared to send over to us with, you know, the SER package, also enclose those summaries.

MR. CIOCCO: Yes, the tracking reports, yes.

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: Which has the latest chapter. Okay.

CHAIRMAN STETKAR: That would help.

MEMBER BLEY: I think that would be real helpful. Thank you.

CHAIRMAN STETKAR: That would help.

MR. CIOCCO: Oh, you're welcome.

MR. OTTO: Thanks, Jeff.

So, as I said, Bob and Tania are going to cover the offsite and onsite power systems and station blackout, including open items, and the conclusions.

And here is kind of an overview of all of the RAIs that have been issued for the different sections, 8.01, 8.02, 8.03, and 8.04. We have a total of 90 questions that were asked, and out of those 90 questions, we have a total of five open RAIs at this point for the review.

And also, I wanted to address the question. We have sent you a draft or an advance copy of the Safety Evaluation back on November 1st. There were definitely a lot of editorial changes since then. But the major items that have been changed was we had an open item in Section 8.02 that was deleted. That was in Section 8.02 related to compliance to GDC 18, and then in Section 8.04 we added an open item for an issue that we are going to discuss during the slides.

So, those were the major changes.

CHAIRMAN STETKAR: Apparently, not all of the text was changed. That open item in 8.02 was open item 8.02-1?

MR. OTTO: Yes.

CHAIRMAN STETKAR: And that's no longer an open item?

MR. OTTO: That has been deleted.

CHAIRMAN STETKAR: Okay. There is still text in the SER that makes reference to that open item.

MR. OTTO: Okay. We will update it then.

MR. FITZPATRICK: Is that in 8.02.5?

CHAIRMAN STETKAR: It's in 8.02.5.

MR. FITZPATRICK: Yes, we missed that one.

CHAIRMAN STETKAR: Okay.

MR. FITZPATRICK: We know it's there, but we missed it in getting it --

CHAIRMAN STETKAR: Okay. That's the problem with getting into this sort of document in progress when we get it. So, that one is actually no longer --

MR. FITZPATRICK: No longer --

CHAIRMAN STETKAR: Okay.

MR. OTTO: We're going to cover all the open items.

CHAIRMAN STETKAR: Okay. Good.

MR. OTTO: I will turn it over to Bob.

MR. FITZPATRICK: Thank you, Ngola.

Good morning.

I'm Bob Fitzpatrick. I am with the Electrical Engineering Branch.

Tania and I this morning are going to do a dual presentation here. So, we will be swapping back and forth.

The original reviewer is now, hopefully, on a warm beach somewhere in retirement.

(Laughter.)

So, the review was then assigned in a couple of pieces to Tania and myself. I was assigned offsite power and station blackout. Tania has Section

8.03 on onsite power, AC and DC. So, we will be swapping back as we go through the presentation.

In terms of the offsite power system, as you have heard quite a bit of detail and discussion this morning, it meets GDC 17 and 18, and we are happy with it.

The switchyard configuration is site-specific.

And was pointed out this morning, there was a change made in the design to accommodate SECY 91-078, where they moved the P1 and P2 buses from the RATs to the UATs, which really gives nice separation from the Class 1E buses.

The other thing is that we now have no open items. We had a draft open item on GDC 18, and I was hoping I wouldn't have to discuss that, but it was my misunderstanding and I fixed it. And that's the bottom line.

Tania?

MS. MARTINEZ NAVEDO: Good morning.

My name is Tania Martinez Navedo. I work with the Electrical Engineering Branch, and I am going to discuss onsite AC power and DC power.

For the most part, and as a summary, the Class 1E distribution system has four trains, as discussed by MHI. The onsite power sources are four gas turbine generators with a capacity of 4500 KW. Each of those GTGs is 50 percent capacity.

The onsite AC complies with Branch Technical Position 8-6 on the degraded grid protection system, and the GTGs are housed in separate rooms in the power systems building.

Next slide, please.

With respect to the onsite DC power systems, the Class 1E batteries are 60 cells. They are 125 volts. Each system consists on a main distribution switch fed from a battery and a battery charger. They are physically-separated and electrically-isolated trains.

The non-Class 1E batteries are 60 cells as well, 125 volts DC, and they provide reliable continuous DC power to non-safety DC loads as well as non-Class 1E INC loads.

Each battery train is housed in a separate room in the power systems building.

And now I am going to turn it over to Bob.

MR. FITZPATRICK: Okay. I would first note that the second bullet on the page, that should be B-AAC. I got a little happy with typing "A's" in that.

(Laughter.)

Anyway, the alternate AAC sources are --

MEMBER BROWN: Which? Where's the edit?

CHAIRMAN STETKAR: The second round bullet.

MR. FITZPATRICK: Should be B-AAC.

MEMBER BROWN: Oh, okay. Thank you.

MR. FITZPATRICK: All right.

The alternate AAC sources in this case are also gas turbine generators, and they are designed A-AAC and B-AAC.

And they are connected to the permanent buses P1 and P2, respectively, and their rating is 4,000 kilowatts.

Design features: they are diverse manufacturers, diverse starting systems and engine sizes. They are located in separated areas, and they have independent auxiliaries not only from themselves, but from the Class 1E system.

Next, please.

These are two items that happen to be confirmatory, but whether they were already confirmed or not, these are two items that we wanted to bring to your attention along the way that are specific to the design.

The first one addresses diversity. When we started out the design, the intent was by the applicant to use a single manufacturer for the GTGs. And when we got into asking them about just how much diversity there might be, and giving them an understanding of our concern about having as much diversity as possible, they have put together a plan to try to get different gas turbine generator manufacturers. So, that is why that is confirmatory, but that's --

MEMBER BLEY: Bob?

MR. FITZPATRICK: Yes, sir?

MEMBER BLEY: At least to me, diversity usually means something other than getting the same device made by somebody different. What is it that gives you confidence that we are meeting the goals of diversity by having a second manufacturer build what I suspect is going to be essentially the same machine?

MR. FITZPATRICK: Well, the real push on diversity comes out of one of the SECY papers, which is guidance, but it says we would like to see more diversity in an evolutionary design. We think that the diverse manufacturers goes a long way towards that. It is certainly a major step up from having the same design --

MEMBER BLEY: Are they designing to exactly the same specification?

MR. FITZPATRICK: Well, they are going to do the same function. The rating is going to be different, but we would expect it to be as different as possible by having two separate manufacturers.

MEMBER BLEY: I guess one thing I wonder about, you know, I have seen cases some years ago, DP cells come to mind, where people thought that they were getting something like that by buying a DP cell from a different manufacturer, and in the end people found out that, even though the box was different and had a different name on it, the insides were all made by the same manufacturer and just purchased under contract.

Is there some way to have some confidence that there is something different about these machines?

MR. FITZPATRICK: Well, that will come at the end when we actually know what they are. We will have a better idea of how different they might be. But, right now, it is a commitment to try to do that.

And by the separate manufacturers, we are hoping that they will be using different -- they may look alike as a box, but different internals --

CHAIRMAN STETKAR: Let me ask you about alike, like a box.

MR. FITZPATRICK: Yes.

CHAIRMAN STETKAR: And correct me if I'm wrong, but it is my understanding that the safety-related GTGs, although they are characterized as a gas turbine generator, they are actually a single generator driven by two parallel gas turbine engines through some sort of gearing arrangement. Is that correct?

MR. FITZPATRICK: Yes.

CHAIRMAN STETKAR: Is it your understanding that the AAC gas turbines will also be similar configuration? In other words, two little gas turbines driving a single generator? Or might they be different? Do you know?

MR. FITZPATRICK: I do not know at this point, no.

MR. HAMZEHEE: Well, why don't we ask MHI if they want to expand on this?

CHAIRMAN STETKAR: Identify yourself, Hossein.

MR. HAMZEHEE: Hossein Hamzehee from NRC.

MR. KAWANAGO: And this is Shinji Kawanago speaking from MNES.

And basically, this is our kind of problem. Now we use one gas turbine. I will put only the problem. However, there is on gas turbine and one single engine and the one generator. They are not twin systems for the alternative --

CHAIRMAN STETKAR: When did that change?

MR. KAWANAGO: Because, basically, when we talk about the computer system or the other now commercial-wide product, maybe we change the manufacturer, and maybe the product itself, as you said, is the same. However, in this gas turbine generator's case, it is completely dependent on -- it's a supplier. It is a jet engine. Basically, it is jet engine.

So, I know, frankly speaking, we can't find the same product between the emergency part of our system and all the --

CHAIRMAN STETKAR: Well, maybe I was misunderstanding. Is the emergency supply gas turbine still --

MR. KAWANAGO: It's still a twin.

CHAIRMAN STETKAR: It is still a twin?

MR. KAWANAGO: A twin.

CHAIRMAN STETKAR: But the AAC will be --

MR. KAWANAGO: It's one engine and the one gas turbine.

CHAIRMAN STETKAR: Good. Thank you.

MR. KAWANAGO: Yes.

CHAIRMAN STETKAR: So, that's a difference.

MEMBER BLEY: And that means that the generators will be different.

CHAIRMAN STETKAR: Well, yes, the generators will have to be different.

MEMBER BLEY: Yes, they will have to be different. Okay. So, that helps.

CHAIRMAN STETKAR: Good.

MEMBER BLEY: Thanks.

CHAIRMAN STETKAR: Thank you.

MEMBER BROWN: Well, it is an interesting question because, when we look at the INC world, having built two microprocessor-based systems, but just, say, an AMD or an Intel microprocessor, people aren't overwhelming excited that that achieves suitable diversity.

MEMBER BLEY: Especially if you run the same software.

(Laughter.)

MEMBER BROWN: Exactly. And so, now if you have FPGA technology and a microprocessor base, that is one thing.

So, right now, a gas turbine is a gas turbine. It's got blades. You put stuff into it. It spins around. I mean, come on, how much different, whether it's got two driving it? I mean the only thing different is the gear. So, if you want true diversity, you could almost, in my mind, I think diesel as opposed to gas turbine generator. Now I know it is not a healthy thought. Nobody likes that.

But I am just trying to relate it to what I am faced with, or we are faced with, excuse me, in the INC world in order to achieve or demonstrate the diversity between the normal and primary stuff and the backup.

MEMBER BLEY: It is interesting, the folks I have met in Europe who have worked in this area don't use the term "diversity". They use redundancy again, but they call it "functional redundancy", which means it is a different gadget, a different device, so that it won't have the same failure modes, where these will almost surely have the same failure modes --

MEMBER BROWN: Yes.

MEMBER BLEY: -- all across the board, and maybe the maintenance staffs.

MEMBER BROWN: A bearing is a bearing.

MEMBER BLEY: I still wonder if we really have diversity here at all, but it does help, to me, that these are different because they will be substantially different designs, I think, and that could make a big difference. Okay.

MEMBER BROWN: I just thought I would point out the dichotomy in terms of the philosophy --

MEMBER BLEY: Yes.

MEMBER BROWN: -- and how we hammer people in one way, and we are kind of letting this one just kind of go along, at least right now, the thought process --

MEMBER BLEY: We have a question about it right now.

MEMBER SHACK: We have had emergency diesels and SBO diesels for a long time.

MEMBER BLEY: We have. We haven't asked for diversity there.

CHAIRMAN STETKAR: Well, they are typically different sizes and things.

MEMBER SHACK: Yes.

CHAIRMAN STETKAR: But they still are diesel engines. One looks like a truck diesel; the other one looks like --

MEMBER SHACK: Just reading the URD, they were sort of going for an emergency diesel and a standby CGT. They were looking for diversity in the prime mover, the big-picture sense.

MEMBER BLEY: In the prime mover, but not in the generator.

MEMBER BROWN: I'm not saying that's necessary. I'm just saying there's a difference between the way -- if you are going to fight for diversity, then how you think about it isn't as relevant to the thought process. I mean, if you have six or eight of them, you can argue that you have got a lot of redundancy and you can cover yourself from a lot of different angles.

So, anyway, I will quit now, John.

CHAIRMAN STETKAR: That's okay.

MEMBER BROWN: Thank you.

MR. FITZPATRICK: Okay. The other bullet on that page is the capacity of the AAC system. As you heard this morning, the original intent of the design was one AAC GTG would be used to start powering station blackout loads, given station blackout, and the other would be used to protect high-value equipment like the turbine generator.

We asked them, the applicant, if they would consider going from just hot shutdown to a cold shutdown with just the AACs, and they have committed to look at that. So that, if you never do get back that second A Class 1E GTG, they will be structured so that they could use the two AAC GTGs to bring them to cold shutdown. And they have agreed to look at that.

But I thought those were two important items that I would share with you.

MEMBER BROWN: Is that a load issue or is that a --

MR. FITZPATRICK: Yes, it is.

MEMBER BROWN: In other words, Class 1Es are what, 5 megawatts -- excuse me -- 500 KW larger? Aren't those 4500?

MR. FITZPATRICK: Right, but they do have --

MEMBER BROWN: And the ones they use are using them for 4,000s?

MR. FITZPATRICK: Right, but they do have the capacity to go to cold shutdown if they use both AAC GTGs for that purpose.

CHAIRMAN STETKAR: Bob, before you go through the open items, I wanted to ask you. We brought it up with MHI a bit, and I found one more of my notes that relates to this issue of any two of four divisions can cope with a design-basis event.

And extending that, there is a section of the DCD that -- it's 8.4.2.1.2; I always like to get that on the record so people can go look at these things -- that addresses the station blackout coping analysis. And it identifies several functions that must be maintained to cope with a station blackout. And three of those listed functions are supplying boric acid tank water using a charging pump, supplying water to the refueling water auxiliary tank using a charging pump, and RCP seal injection using a charge pump, with a water source from the water auxiliary tank.

Then, there is a statement that says, "The plant can be kept in the safe shutdown conditions by the above operations performed only on one Class 1E train."

Well, it could if only one Class 1E train was A or D, but not B or C because B and C do not supply the charging pumps.

So, I am curious, when you do your reviews of the electric power system, where is this notion of statements that any one of the four is sufficient, any two of the four is sufficient? Where are those questions raised?

Because I recognize you are electric power people; you tend to look at power supplies and ratings of circuit breaks, and, you know, all of that good stuff.

MR. FITZPATRICK: Right.

CHAIRMAN STETKAR: The Chapter 15 people just tend to look at thermal hydraulic analyses and whether they get enough flow out of "N" number of pumps.

Where do these issues about coordination of the fact that, if I only have power to only bus B, I don't meet three of those station blackout coping analyses, and that maybe there isn't complete freedom of where you align those AAC GTGs, who answers that question in the review process?

MR. FITZPATRICK: Well, we try to do that. We understand that the A ATG goes to the P1 bus, and then, from there, it goes to only A or B, and then the B one goes to either C or D, right.

It is not clear to me that that is a perfectly true statement that any two of the four can do that. It is made a lot, but in the analysis, from our perspective, it is really not the point. I think the more important point is that they can take a train out, any train out, go down to three trains, and still meet the single failure criteria.

So, I don't believe our review tried to --

CHAIRMAN STETKAR: Okay.

MR. FITZPATRICK: -- demonstrate that any two of the four could absolutely do that.

CHAIRMAN STETKAR: Okay.

MR. FITZPATRICK: It is a claim that is in there.

CHAIRMAN STETKAR: But, essentially, you look at --

MR. FITZPATRICK: Right, our focus is, if you can take a train out and you've got three left, any two of those three, and that is a true statement, it meets the single failure criteria, and that is a good design.

CHAIRMAN STETKAR: Provided that they realignment the A1 and D1?

MR. FITZPATRICK: Exactly. Right.

CHAIRMAN STETKAR: That's the provision --

MR. FITZPATRICK: Upfront, yes.

CHAIRMAN STETKAR: But this is even a stronger statement. It says, "Any one Class 1E train, the plant can be kept in safe shutdown condition by the above operations performed only on one Class 1E train." "The above operations" tell you about how you get power to these things.

MR. FITZPATRICK: Right.

CHAIRMAN STETKAR: But it's not, not if that only one train is B or C. You don't have charging.

You know, from your perspective, in terms of single failure criteria, we are talking about station blackout coping, so we are beyond design-basis events.

MR. FITZPATRICK: Right.

CHAIRMAN STETKAR: I'm more curious about, are there many statements made in the Design Certification Document that are not necessarily probed deeply during the staff's review because, from your perspective, it doesn't make any difference whether they say it's two out of four, and from other reviewers' perspective, they say, well, as long as we have two, we're okay.

And it is not at all clear necessarily that you will always have the two that you need, or in this case the one that you need.

MR. FITZPATRICK: Yes.

MR. HAMZEHEE: John, this is Hossein Hamzehee from the staff.

I think one of these areas, as you know, is in Chapter 19, when they put their dependency matrix together. So, if they make the wrong assumption, that those PRAs, the success criteria and evaluations are going to be incorrect. So, we do look at it under PRA, Chapter 19.

CHAIRMAN STETKAR: Okay. That is the one area where it would all come together?

MR. HAMZEHEE: Yes. But, also, if there is a statement that is incorrect, we, as the staff, have to make sure that they get corrected regardless. So, if you see that there are statements throughout the DCD that are not completely correct, we have to go back and challenge to it and correct it.

CHAIRMAN STETKAR: Well, see, from my perspective, it is not clear. This one doesn't seem correct. The other ones may, indeed, be correct, depending on how you define a design-basis accident and what functions need to be supplied, and whether or not the charging pumps, for example, are required for that.

It is kind of an open-ended question. One of the functions that our Subcommittee performs, I think, is we try to keep a bit of this integrated perspective about how all the parts of the design come together. It is a little bit difficult when you receive the chapters this way because today we are looking at electric power and we may not look at the accident analyses until sometime in the spring.

But I was just curious whether during the electric power review you challenge those things. And I think you gave me the answer, that you look at it from --

MR. FITZPATRICK: Yes.

CHAIRMAN STETKAR: -- the single failure criteria and give --

MR. FITZPATRICK: I think also, which we will speak to a little bit later, there may not be a lot of charging necessary if you go with their .2-gpm leak in the RCP seals. That may factor back into that because the cooling is done --

CHAIRMAN STETKAR: That is for the first hour.

MR. FITZPATRICK: Right.

CHAIRMAN STETKAR: But this is after. This is the eight-hour coping period. So, I suspect that sometime in the -- this is while you are supplying the buses from the AAC GTG. So, I suspect over eight hours you probably need to get water in there somehow --

MR. FITZPATRICK: Yes.

CHAIRMAN STETKAR: -- even with the .2

gpm.

MR. FITZPATRICK: Right.

Okay, next.

Just a listing of our open items before we get into talking about them. Section 8.03, we have one on maintenance and testing of the inaccessible cables. That came up earlier today. Also, GTG reliability, we'll speak to that. The battery sizing calculations. Then we get back into station blackout with seal leakage, RCP seal leakage, and the periodic testing of the AAC GTGs.

MEMBER BLEY: Bob?

MR. FITZPATRICK: Yes?

MEMBER BLEY: We are going to take up the GTG reliability in February, but have you had a chance, have you folks reviewed that report that we just received, the qualification report? And can you tell us a little bit about where you stand on this reliability issue, a little more than I have read?

MR. FITZPATRICK: Okay.

MS. MARTINEZ NAVEDO: We can give you a summary, because we actually concentrated more on the issue of the reliability, rather than all the specifications in the report. But we can also go through the changes -- there are not that many -- as we go through this question of that open item.

MEMBER BLEY: Okay.

MS. MARTINEZ NAVEDO: But we can go into the open item without going into the specifications in the report.

MEMBER BLEY: Okay.

CHAIRMAN STETKAR: I think that is a good plan. Offline, during the break, I had a discussion. I think we sort of have a plan about how to kind of split the discussion.

So, I think it is good for you to summarize the open item, and then, in February, we will decide what material needs to get discussed in February in more detail.

MEMBER BLEY: Okay.

MR. FITZPATRICK: I will turn it back to Tania to start on Section 8.03

MS. MARTINEZ NAVEDO: Okay. The first open item we are going to discuss today is on 8.03.01, and it is pertaining to the maintenance and testing of inaccessible cables.

This item is related to Generic Letter 07-01, and it is guidance for preventing degradation of medium-voltage cables.

Earlier in the meeting, I believe there

was a question raised about including low-voltage cables within the scope of the compliance with 07-01. It does cover low-voltage and medium-voltage cables, that's true. The summary report does talk about both of them, but most of the problems, the failures, are associated with medium-voltage. That is the reason why staff concentrated more on those.

There were failures reported in the summary report on the 125 volts and 480 volts, but most of the failures were pertaining to the 4160 voltage level.

CHAIRMAN STETKAR: Tania, I think you need to go back and talk to the plant license renewal folks because there is currently in the works a Revision 2 to, I think it's NUREG-1801, the GALL report. And that revision explicitly says that the scope of the underground cable issue, if you want to call it that, should include voltages down to anything above 400 volts AC.

It also cites industry operating experience saying that people have experienced failures in those cables, and, indeed, the license renewal folks are taking a pretty hard line with plants that are currently coming in for renewal of their licenses, that the scope should extend down to those 400-volt cables, and also, not just 400 volts, but also not limited to the -- what it is called? -- significantly energized.

So, they are just saying any cable 400 volts and above that is in scope for license renewal and, essentially, either safety-related or station blackout recover, underground, regardless of whether it is normally energized or normally de-energized, regardless of the fraction of time that it is energized, should be subject to both moisture control and cable testing, you know, insulation testing programs.

So, I think if we are doing that on the license renewal stage for the current plants, it seems to make sense to apply it consistently for the new reactors that are coming in.

MS. MARTINEZ NAVEDO: We will look into that.

CHAIRMAN STETKAR: Yes.

MS. MARTINEZ NAVEDO: At this point, and pertaining to this particular item, MHI has proposed several mitigation techniques. For example, the duct banks are sloped for water drainage, and the manholes, they are going to provide sump pumps to pump the water out of the manholes. Also, they are going to propose vertical testing of the cables.

Now they are going to put together a COL information item, so that the COLA applicants are going to be the ones responsible to perform this testing and the visual inspections, and so forth.

So, that is where we stand on this COL item, and that may be the right place to look at this new guidance in light of the --

CHAIRMAN STETKAR: The only question, obviously, for the DCD, though, is if the scope extends to 400-volt cables -- I don't know what the design looks like, but if, for example, they have some 400-volt cables that are direct buried in soil because they felt that they didn't need to worry about them, for example, there might be changes to the design that they want to make as far as routing of the cables or ensuring that they have dewatering capability for ducts, you know, that contain only those lower-voltage cables.

So, recognizing that certainly the monitoring and testing program and any site-specific dewatering certainly comes under the COL, but there could be implications backward to the basic design of whatever cables they might have underground.

MS. MARTINEZ NAVEDO: Okay, we'll look --

CHAIRMAN STETKAR: That is the only reason I am raising it, you know, sort of at this stage, to make sure that a COL applicant suddenly isn't surprised with something, that they now need to address a much broader issue that is handed to them, when perhaps some of it could be addressed at the design phase.

MS. MARTINEZ NAVEDO: Okay.

CHAIRMAN STETKAR: At least in terms of physical design, sloping of ducts and accessibility, and that sort of thing.

MS. MARTINEZ NAVEDO: Okay. We'll look into that.

The next slide.

Okay. The next slide, as we discussed before, is pertaining to the GTG reliability. Going back to Regulatory Guide 1.155, MHI chose the reliability target of 95 percent with a 95 percent level of confidence.

As they mentioned before, it is a first-of-a-kind application, and the open item really is staff's verification of the compliance with that reliability target they have committed to. Since there is no operational experience with that particular type of equipment in the U.S. plants, MHI is going to furnish data that supports their reliability target. That is what staff is really looking into without going into any of the details in the report.

So, that is basically where we stand. We are expecting them to complete testing, and they are going to give us a report in which they detail all of the results as far as if there are any failures or not and if the qualified the gas turbines at that reliability target specifically.

CHAIRMAN STETKAR: And you're saying that Rev. 2 of that technical report does not yet contain the actual data?

MS. MARTINEZ NAVEDO: No.

CHAIRMAN STETKAR: So, it is just an update to the plan? I think what we discussed kind of at the break, what may make sense for our February meeting, if that is the case, because we did have several questions about the data itself, the source of the data, both generic data and how they were running the tests, what may make sense for February is to kind of ask Mitsubishi to give us a presentation on the update to the technical report. Essentially, give us an update, where they are in their testing program. If they had any preliminary data that they would like to share, we would certainly be interested in that, but recognizing that if the tests aren't complete, they may not want to share partially complete data.

And at the same time, Dennis asked about the Interim Staff Guidance. It is ISG-21 that governs this. To get a presentation from the staff on that ISG, especially it doesn't sound like this open item will be resolved in the near-term, at least before February, will it? Do they plan to have the testing program complete by then?

MR. FITZPATRICK: Yes.

CHAIRMAN STETKAR: Oh, they do?

MR. FITZPATRICK: They're scheduled to get done the first week of December.

CHAIRMAN STETKAR: Oh, if that's the case, then perhaps in February we might have time to actually look at the data itself.

MEMBER BLEY: Which would mean getting the report on the data --

MS. MARTINEZ NAVEDO: The report, yes.

MEMBER BLEY: -- well ahead of time.

CHAIRMAN STETKAR: Well, yes, the meeting I think is February 23rd. So, we need the information mid-January to late January, something like that. It might be tight.

MR. CIOCCO: Yes, Jeff Ciocco, NRC staff.

We won't be able to -- phase 5 of Chapter 8 is when we will come back and close the open items. So, we will have all of the information.

CHAIRMAN STETKAR: Okay.

MR. CIOCCO: We will have evaluated all of the GTG testing results reports and come back with our Final Safety Evaluation Report with No Open Items, if you will. So, that won't be prepared for the February meeting.

CHAIRMAN STETKAR: Okay.

MR. CIOCCO: But possibly, you know, there may be some opportunities in February for other information.

CHAIRMAN STETKAR: Okay.

MEMBER SHACK: When will we hear about things like the fragility of the CTG?

MEMBER BLEY: Seismic fragility.

MEMBER SHACK: Seismic fragility.

MR. HAMZEHEE: Hopefully, that is in Chapter 3.

MEMBER SHACK: Is it 3? I thought --

MEMBER BROWN: Well, I mean your qualification plan includes a seismic analysis and loading information. So, I would presume that would have been covered under whatever assessment of this reliability would be put forth at the time we are going to talk about it.

CHAIRMAN STETKAR: Well, Chapter 3 typically talks about seismic --

MEMBER BROWN: No, I understand that.

CHAIRMAN STETKAR: -- all things seismic.

MEMBER BLEY: But probability, not fragility. You probably don't get that until you get to the PRA.

CHAIRMAN STETKAR: You don't get equipment fragilities, but I mean that's typically the place where we could -- of course, we could ask at any time, but --

MEMBER BROWN: I guess one of my questions would have been -- I mean I don't want to go in detail because it is a February issue, but I would like to at least hear -- I mean we are getting 150 runs, but this is of a nice, new gas turbine generator. It's tooling along, doing what they're supposed to do. But, then, once you have had it exposed to a seismic event, what expectations are after that? Is it supposed to work? I presume it is supposed to work after the seismic event.

(Laughter.)

And the next question --

CHAIRMAN STETKAR: The safety-related one certainly. The other ones, it is not so clear.

MEMBER BROWN: There's a question or comment, however I phrased it.

The second point, though, was, what type of 95/95 performance do you expect from it after it has experienced its seismic events? Are you going to rerun a set of 150 runs to see that it will start 150 times after it has experienced seismic testing?

MEMBER BLEY: And this is an area where I don't know we have ever collected this kind of information --

MEMBER BROWN: I don't know, either.

MEMBER BLEY: -- either design fragility analysis or testing on gas turbines. They won't be like diesels.

MEMBER SHACK: Well, actually, it is in the URD.

CHAIRMAN STETKAR: They don't do it for the diesels, for example. Current diesels, they don't shake them and then run tests. It's beyond what people typically do for any equipment.

MEMBER BROWN: All I know is the last diesel we depended upon in my program, in the programs

I was responsible for, we actually shock-tested the diesel on the barge, and then we ran 500 instant starts where it had to be up and running in 10 seconds or less in order to support the safeguards loads.

That was a very interesting test. It was an endurance test that it did involve that number of starts and stops over a large period of time. So, that is where I was coming from.

CHAIRMAN STETKAR: I mean we don't, you know, it is a difference perhaps in philosophy, but for current licensing there's no requirement to shake a piece of equipment and then demonstrate its operability.

MEMBER SHACK: I suspect if a plant ever undergoes a safe shutdown earthquake, you will be looking at it quite carefully, however, post-mortem.

(Laughter.)

MEMBER BROWN: Well, it is supposed to be helping you out during that circumstance potentially.

MEMBER SHACK: Well, but, you know, the circumstance is to survive, not to worry about what its condition is afterwards.

MEMBER BROWN: Well, if you can't use it, what difference does it make?

MEMBER BLEY: Well, that's true.

Speaking of real-world kind of things, I know it is difficult often, because of previous work I had done in Japan, but if similar gas turbines have been running for some time in commercial facilities, are they planning to have any operational histories on the diesels from tests at the operating plants? Have they been able to get that kind of information? Do you know?

MR. FITZPATRICK: We asked the question early on in the review about, do you have any reliability data on gas turbines? That was basically to get a warm feeling of where we were headed.

Our plan for acceptance, final acceptance of this design, is coming right out of their testing program on the prototypes, exactly what the prototype can do. So, that is going to be our focus for acceptability. And we won't know that is acceptable until they get through the testing.

CHAIRMAN STETKAR: I think that this is something that there is obviously quite a bit of interest among the Subcommittee members anyway on we will call it a general issue of gas turbine reliability, whether it is without the seismic event or post-seismic loading.

We may want to think about talking to the staff about having some type of interim presentation sometime after MHI has completed their test program, has developed your report on the test program results, but not necessarily waiting all the way until the Final SER with No Open Items to visit it, just so that we would have an opportunity to have a sense of what information is being used to support the reliability claims, and if there is a need for additional evaluations, to kind of have some input to that process, rather than pushing it off to the very end.

So, we may want to think about that. I don't know how the schedules will work out, but perhaps sometime next spring, depending on what MHI's schedule is for completion of the testing and delivery of whatever technical -- well, it is a technical report, I guess, with the results of the testing. We can talk about that later, but it sounds like it is something we don't necessarily want to push off until the Final SER, just to avoid any potential surprises, basically.

MR. HAMZEHEE: Yes, and I think, John, you already have a copy of the test plan.

CHAIRMAN STETKAR: We do. We, as members, don't have Rev. whatever it is, the most recent revision of the test plan, just because I asked Neil not to distribute it, to avoid confusion in the last week. But we do have that latest revision, yes.

MR. HAMZEHEE: And then we make sure that you get all the related documents as soon as possible.

CHAIRMAN STETKAR: Yes.

MR. HAMZEHEE: But one thing I would like to emphasize is the scope of that. That has already been reviewed and we understand.

And just as an example, exposing GTG to seismic and then testing it again is outside the scope.

CHAIRMAN STETKAR: Yes, I understand.

MR. HAMZEHEE: I just wanted to make sure we don't have false expectations.

CHAIRMAN STETKAR: I understand that, but, as part of this general discussion, my understanding of it personally does not necessarily reflect other members of the Subcommittee nor the full Committee.

MR. HAMZEHEE: All right.

CHAIRMAN STETKAR: So, that is why I want to have an opportunity to discuss it sooner than later, if there are some substantial lingering concerns at either the Subcommittee level or the full Committee.

MEMBER BROWN: Does the staff ever talk to other government agencies, such as the Navy has been relying on gas turbine warships since about the mid-seventies or something like that? They have got a lot of data.

I don't know whether they are the same. They are made by GE, I believe. They are the LM2500s and other types, and then there is another style. Those are the main engine-type gas turbines, and there is a whole class of them that are down in the 3-to-5-megawatt range that they use for ship service power.

I mean I don't know how well the Navy keeps information, but --

MEMBER BLEY: Past experience in the civilian nuclear industry, and trying to obtain cooperation from different offices in the Navy on data have failed miserably, but maybe it is time to try again.

(Laughter.)

MEMBER BROWN: Well, I'm just saying, I mean from the NRC to the Navy, or has it been from industry to the Navy?

MEMBER BLEY: Oh, it's been NRC to the Navy on the nuclear side. Essentially, got letters saying this is none of your business.

MEMBER BROWN: Pound sand, huh?

(Laughter.)

MEMBER BLEY: Not quite that kind.

(Laughter.)

But that was a long time ago, and others have tried other parts of the Navy to cooperate, but they haven't really been part of the --

MEMBER BROWN: I'm just saying their environmental conditions are fairly stressful. I mean they're banging around --

MEMBER BLEY: Yes, I mean it would be excellent data if there's a way to do that. And it might be time for them --

CHAIRMAN STETKAR: If it's available and if, indeed, it is compiled.

MEMBER BROWN: -- for an entree to see if there could be cooperation.

MR. HAMZEHEE: We will look into it. However, I think Mitsubishi has some test data itself, and they have to look for things that apply to their design, their configuration, rather than us going and finding them data. But if we find areas that we may not agree with their conclusions, then we will look into other areas for that kind of information. But I don't believe right now we are in the position to provide data to them.

MEMBER BLEY: No, we aren't suggesting that.

CHAIRMAN STETKAR: No, no, no.

MEMBER BROWN: You could give yourself a warm fuzzy; that's all.

MEMBER BLEY: But you could understand, and real-world experience is never quite the same as test data, you know.

MR. HAMZEHEE: And also, this is the first time in this country that we are using anything other than diesel generators --

MEMBER BLEY: Not quite.

MR. HAMZEHEE: -- in safety-related --

MEMBER BLEY: Oh, safety-related, yes, sir.

(Laughter.)

MR. HAMZEHEE: That is why we have got to be a little more careful.

MEMBER BLEY: Yes.

CHAIRMAN STETKAR: Okay. I think the message is pretty clear that we would like to visit this topic sometime in the interim, certainly before we get to the Final SER.

MR. CIOCCO: Okay, and we can talk to you certainly. It is almost a follow-on to what MHI presented back in May 2009.

CHAIRMAN STETKAR: Yes. Yes.

MR. CIOCCO: They went into great detail on the reliability side --

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: -- and then qualification, everything.

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: And we could do that as an interim --

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: -- before we present phase 5 SE.

CHAIRMAN STETKAR: Yes, I think that would be a good idea.

MR. KAWANAGO: May I?

CHAIRMAN STETKAR: Sure. Just speak into it.

MR. KAWANAGO: I'm Shinji Kawanago, Mitsubishi.

And we understand the February timeframe. We will have the presentation not only for the test results, actually the test results, and it's now conducted. And hopefully, this week I know we would finish everything on my 50 times test. And those are the reasons I explained to you the experience and the reliability data.

But I would like to emphasize one thing. When we talk about the reliability of the gas turbine generator, and there are so many kinds of gas turbine generators, but reliability itself is different and it depends on actually the product.

It is our gas turbine generator's design basically came from the jet engine. Jet engine's gas turbines, it is a very, very high reliability. However, it is a 10-megawatt. So, a large type of the gas turbine generator's reliability, unfortunately, is not so good. So, just we want to focus on the actual reliability, and it came from the jet engine.

Basically, though, in the technical report you can see the totals are over 7,000 times the reliability data. It is good reliability data.

But, again, on a February timeframe, we can explain.

CHAIRMAN STETKAR: Okay. Just be aware, timeliness is important to us because scheduling our Subcommittee meetings is an interesting exercise. Make sure that you don't rush things too quickly just to accommodate that particular Subcommittee meeting. In other words, make sure that you do have your report prepared, that you have time to transmit it to the staff, that the staff at least has time to receive it.

Because in the sense of what Dr. Bley was saying earlier, one of the things I would like to avoid with this Subcommittee is a sense of reviewing 75 percent information and then, you know, several follow-ons as we get updates. If at all possible, we would like to review reasonably-finished products.

So, if, for example, the report isn't available in time for the February Subcommittee meeting, I am sure that we can adjust our schedule and work out a time slot for it in one of the later subcommittee meetings.

MR. KAWANAGO: Yes, the test results, you can see the reliability test will be available at the end of this month.

CHAIRMAN STETKAR: Okay. Good. Thanks.

And with that, Bob?

MEMBER SHACK: The item we weren't going to discuss today.

(Laughter.)

CHAIRMAN STETKAR: Yes. Well, can you imagine what time we would adjourn if, indeed, we were going to discuss it?

MS. MARTINEZ NAVEDO: The next item is for

Section 8.03.02 on battery sizing calculations. The DCD currently reported that there was a requirement of 1 ampere for the Class 1E 480-volt load center.

If we go back to operating experience, it seemed like it was too low compared to the operating fleet. So, the applicant indicated that their basis for that specific number was based on Japanese experience.

Right now, we have it as an open item because MHI plans to furnish data related to that, more detailed to the specific design of the loads, and come back to us with a report explaining why is that capacity not to handle the load requirements.

MEMBER BROWN: What's the existing fleet battery?

MS. MARTINEZ NAVEDO: I'm sorry?

MEMBER BROWN: What's the existing plants? That seems like an abominably small number. I'm not surprised that you all ask a question.

MS. MARTINEZ NAVEDO: Yes.

MEMBER BROWN: I mean I would have thought lots of amps.

MS. MARTINEZ NAVEDO: It is a little bit higher, but since this 1 ampere is so low, we wanted for them to go back and explain to us what was the basis of it. But it is definitely more than that. It depends on the unit and where it is located, the different designs, BWR, PWR. It's different; it just varies. But this one is too low compared to the PWR operating fleet.

CHAIRMAN STETKAR: It almost has to be really plant-specific because --

MEMBER BROWN: Oh, I understand that.

CHAIRMAN STETKAR: -- it depends on which motor-operated valves you have, you know.

MEMBER BROWN: I understand that.

CHAIRMAN STETKAR: But an amp is pretty small.

MS. MARTINEZ NAVEDO: We do expect the applicant to come back with a report that could resolve this concern from the staff, and we will definitely share it with you as we receive it.

Bob?

MR. FITZPATRICK: Moving on to station blackout, we have two open items. The first one concerns reactor pump seal leakage. The assumption that the applicant has made in their coping analysis is that seal leakage will be limited to .2 gallons per minute per reactor coolant pump, which when you multiply out means that there is like 48 gallons missing at the end, and the design isn't going to miss 48 gallons.

(Laughter.)

There is way too much inventory to even worry about it.

However, our perspective has been, and based on NUMARC-8700, they recommend an assumption of 25 gallons per minute, unless you can show something different as an assumed seal leakage for each of the reactor coolant pumps.

So, basically, they are over two orders of magnitude lower, which would be less conservative unless demonstrated otherwise. So, we have kept this item open until we can get a really better handle on, is that really a good number or maybe they can actually, with all the water that they do have, maybe they ought to accommodate the 25 gallons. But we are just not ready to close it out. So, we are pursuing it.

CHAIRMAN STETKAR: I'll ask first; then you can.

I didn't get a chance to look back at NUMARC-8700. Is that 25 gpm based on -- what is the basis for that? Is that failure to isolate the No. 1 seal return line or is it a surrogate for possible damage to the seals? Do you happen to know?

MR. FITZPATRICK: I don't know the specifics of that, no.

CHAIRMAN STETKAR: Okay. Thanks.

MEMBER BLEY: I mean that's crucial, as is the design of the seal package. I'm a little curious why we're trying to resolve this one under the electrical.

You talked about it earlier, but when are we going to see the details on the design of the seal package and the basis for all these assumptions that are embedded on the electrical side here?

MR. HAMZEHEE: Yes, that is under Chapter, I think, 4 and 5, 5 probably.

CHAIRMAN STETKAR: Five, I think, typically, is the reactor coolant pumps.

MR. HAMZEHEE: RCS and connecting systems.

CHAIRMAN STETKAR: Yes, I think it's typically in Chapter 5, yes.

MEMBER BLEY: Yes, but it's both; you have the operational issues and then you have existing tests.

MR. HAMZEHEE: Correct.

MEMBER BLEY: And we have very different results and tests for different kinds of seal packages and seal designs, whether they're floating or rubbing. Well, they don't actually rub. So, the details there are important, and we will look forward to that.

But I guess I don't see how you resolve it here until that one closes.

MR. FITZPATRICK: We're not able to resolve it within the Branch at all, but we're going to need help from other people for sure.

MR. HAMZEHEE: But I think as a minimum they have to make sure that the right information is provided in Chapter 5, so that they can use that as a basis for their station blackout and our CPP LOCA and all.

CHAIRMAN STETKAR: Right. It absolutely has to be consistent because, you know, it feeds back into the timing on getting gas turbine realigned and whatnot.

MR. FITZPATRICK: And then, our second open item in Section 8.04 has to do with periodic testing of the AAC power system. The applicant has stated that that will be done, but it really doesn't put it onto the COL applicant to make sure that it is done.

So, we have asked for a COL item, information item, to be put in a future revision, so that we can put this onto the COLA applicant because they are the ones that will be doing it throughout the life of the plant.

CHAIRMAN STETKAR: I just thought of something, Bob. Do you happen to know, are the AAC gas turbines specifically listed in the design reliability assurance program? Have those lists been developed yet? You know, there's a requirement to --

MR. FITZPATRICK: Right.

CHAIRMAN STETKAR: -- populate that with risk-significant, whatever that means, equipment. Do you happen to know, are the AAC gas turbines on those lists or those lists are not yet completed?

MR. CHOPRA: This is Om Chopra from NRO staff.

Yes, the SBO alternate AC source is part of the Maintenance Rule.

CHAIRMAN STETKAR: Okay.

MEMBER SHACK: The Maintenance Rule is one thing.

CHAIRMAN STETKAR: But that's only the Maintenance Rule.

MEMBER SHACK: Yes.

CHAIRMAN STETKAR: Well, we haven't visited that chapter yet. Some applicants have developed not tech specs. I have forgotten what they call them.

MEMBER BLEY: Assessment Protection Criteria.

CHAIRMAN STETKAR: It is a set of things that look like LCOs and surveillance requirements, except they are not under the technical specifications. And I don't know whether MHI is developing something like that.

MEMBER BLEY: And they are in some DCDs, actually.

CHAIRMAN STETKAR: And they are in DCDs, that's right. That would be, if MHI is developing that for this plant --

MEMBER SHACK: It's a DRP program.

CHAIRMAN STETKAR: No, it's beyond the DRP program. It is something that looks like tech specs, but they don't have the legal force of technical specifications. But they do specify availability in terms of allowed outage times, if you will, and surveillance requirements.

MEMBER BLEY: It is the document you had on the AP1000, actually.

CHAIRMAN STETKAR: Since you want to mention it, AP1000, for example, has --

MEMBER BROWN: It was investment protection, is what they called it. I mean that is the two we were talking about.

CHAIRMAN STETKAR: And it is a separate document, actually, but it is an explicitly documented program that would at least satisfy this question. I don't know whether MHI has one of those are not.

MR. CHOPRA: I think what you are referring to is the AP1000 design. That is a passive design, so they do have some non-safety-related results which come under the RTNSS program.

CHAIRMAN STETKAR: RTNSS.

MR. CHOPRA: And I guess you are referring to those tech specs.

MEMBER SHACK: Not quite tech specs.

CHAIRMAN STETKAR: But some of the RTNSS stuff is in the tech specs. This is a separate program, and I have forgotten what they call it.

MR. CHOPRA: Investment protection --

CHAIRMAN STETKAR: Is it investment protection?

MEMBER BROWN: Well, the title of the document we were looking at in the last meeting was actually a DAS Planning and Functional Design Summary Report, and it included investment protection issues, from what I --

CHAIRMAN STETKAR: Okay. Well, we don't need to go into the other design. There is a separate name for that sort of thing.

MEMBER BLEY: I'm scrolling through to see if --

CHAIRMAN STETKAR: It's kind of the non-safety-related tech spec analogy.

Anyway, we understand the concern here, that you are looking for some type of commitment for an active testing program that would go beyond the Maintenance Rule-type reliability controls. Okay.

MR. FITZPATRICK: And our last slide.

Just in conclusion, the applicant has provided sufficient information to support the offsite power system with regard to the interrelationship among the nuclear unit, utility switchyard, and the interconnecting grid.

With the exception of three open items that we identified, the applicant has provided adequate information on the onsite power system with regard to the availability of sufficient power to mitigate design-basis events, given a loss of the offsite power system and a single failure in the onsite power system.

And with station blackout, with the exception of those two open items, the applicant has provided necessary analyses to determine the capability of the design to withstand and recover from SBO for an eight-hour duration.

And we are ready for comments and questions.

CHAIRMAN STETKAR: Any of the members have any more questions for the staff?

(No response.)

Good job. Thank you very much for the presentation. I think we understand where you are, and we are, indeed --

MEMBER BLEY: Don't break. I wanted to ask --

CHAIRMAN STETKAR: Don't break?

MEMBER BLEY: -- something before we break.

CHAIRMAN STETKAR: Okay, I won't.

MEMBER BLEY: May I?

CHAIRMAN STETKAR: You may.

(Laughter.)

MEMBER BLEY: Now?

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: A request for this

afternoon, or not a request, but something I want to ask about. When we get into the conduct of operations section, if Mitsubishi can lay out their expectations of the schedule with which the plans that we will talk about this afternoon will actually be implemented, you know, when procedures will be in place, when all of the things that Chapter 13 aims at eventually will occur, that would be helpful.

That's all I wanted to say.

CHAIRMAN STETKAR: Thank you.

MR. HAMZEHEE: And, John, I have one just clarification comment.

Hossein Hamzehee from the staff.

I just want to make sure that we all have the same expectation for our February meeting on GTG. We had a two-day meeting last year, went over the entire scope, test plans and all those. At that time, we agreed that, once MHI completes the test and we get the test report, we will come back to you again and talk about the results.

So, I will talk about that more with you, but I assume that in February we will just talk about any changes to that technical report that we have submitted and presented to you a year ago, and mainly focus on the results.

CHAIRMAN STETKAR: Let's see what's forthcoming in the next month or so.

MR. HAMZEHEE: All right.

CHAIRMAN STETKAR: I think that Dennis mentioned interest in the ISG, which is kind of a higher level, but I think we're interested in hearing about that.

Regarding specific technical information that is discussed in February, at a minimum, it is whatever changes were to the qualification and test plan, at a minimum. Anything more that we can discuss in terms of actual results of the testing and both the data from the tests that Mitsubishi is performing right now and any other supporting data that lends confidence in the claimed reliability, whether it is generic data from other gas turbine generators that are in use in Japan, whether it is data from other gas turbine generators from other applications, if that is available.

We would certainly like to discuss that, but I don't want to do it if the information is only 50 percent processed yet because I don't want to come back and revisit it a second and third and fourth time over the next several months.

So, that's why I say I think you will have to work with Neil and our staff to determine what level of information will be available by about the third week in January, which is when we need it to basically support that -- I believe the meeting is on the 23rd. I could be wrong about the specific date, but somewhere around that third week in February kind of timeframe.

And we can't necessarily settle on that detail today because we don't know what information will be available.

Thanks.

Anything else? Members? Anyone else?

(No response.)

Nothing? With that, we will recess until one o'clock.

(Whereupon, the above-entitled matter went off the record at 11:56 a.m. and resumed at 1:00 p.m.)

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

1:00 p.m.

CHAIRMAN STETKAR: We are back in session, and I guess we will hear from MHI on Chapter 13. Kenji?

MR. MASHIO: Yes. I will explain the U.S. APWR Design Certification, Tier 2, Chapter 13.

Presenters are many speakers, myself, I am Kenji Mashio from Mitsubishi Nuclear Energy Systems, and Ron Reynolds. He is also in MNES, and he can support mostly the second issue. And Russ Bywater, he will come with later. And then, that will be our report on any power clarifications.

The contents are described. The parties, we can explain the overview of the chapter, and, second, we will go through every section of this Chapter 13 and the RAI summary and the overall summary.

This overview of the chapter, the title reads, "Conduct of Operations". As part of the chapter, this chapter provides information relating to the preparation and plans for the US-APWR plant design, construction, and operation. We can through each section on Chapter 13.

But 13.1, organizational structural of

applicant, this section describes COL applicant's responsibilities for the following: management and technical support organization, which includes design, construction, and operation of the facilities; organizational arrangement, and the qualifications. The second is operating organization, and the next one is qualification of nuclear plant personnel.

13.2, training, this section describes the COL applicant's development of training programs. This section, we received the RAI which refers to ensure something to provide some guide, directional and insurance of the training development.

So, in this section, we did include, we refer to how we can use our training program structure and content based on the NEI 06-13A. And we also describe the licensed operator initial and continuing training and non-licensed plant staff training. But in the specific detail of the operating plant, it is a part of the COLA applicant development.

13.3 is emergency planning. This section provides design features to support emergency planning as a design standard, but the actual emergency, comprehensive emergency planning, based on the COLA applicant documents. So this DCD provides some clarification, such as a Technical Support Center, which meets NUREG-0696. Again, emergency planning itself is part of the COL applicant's responsibilities.

13.4, operational program implementation, this section describes the COL applicant's development of the operational program implementation. This information includes a schedule with milestones and commitments, and SECY-05-0197.

The next is 13.5, plant procedures. This section also describes the COL applicant's responsibilities for developing the following: administrative procedures and operating and maintenance procedures. And we also got an RAI to also ensure the operating procedures development. We provided a brief description of the scope of the operating procedures. And so -- was operating under emergency operating procedures and maintenance and other operating procedures.

MEMBER BLEY: Is it your very feeling that development of the procedures, and I'm especially talking about emergency and abnormal operating procedures, is up to the COLs? I mean you are developing procedures already that we saw implemented up at Cranbury, and all the owners' groups have essentially put together the procedures for the operating plants.

So can you explain a little bit why this is a COL item?

MR. MASHIO: Okay. Regarding the emergency operating procedures that really are related to the Chapter 15 and Chapter 19, the MHI developed, are developing the ERG, Emergency Response Guideline. So, this ERG incorporates the assumption from the Chapter 15 and the Chapter 19 action.

So, as a different standard, MHI provides ERG, but there are actually other procedures, which includes EOP, Emergency Operating Procedures, our COLA applicant will be developing.

MEMBER BLEY: So, you are really putting it to the applicants? I mean that requires a lot of analysis backup to get those organized properly, but it is on their backs. So, it will be very interesting when we have our first COL meeting to see --

MEMBER SHACK: It will be on their bill anyway.

MEMBER BLEY: Well, that's a different story. If they are being developed and they just won't be done until COL time, but they are being developed by MHI, I can understand that. But if only the FRGs are being developed and emergency procedures are left to the COLs, I am a little at a loss to understand how they are going to pull that all together.

But you have actually developed EOPs for the simulator you have up at Cranbury, at least some of them.

MR. MASHIO: Let me clarify. MHI provides the ERG. I said ERG is very similar over the EOP. This difference is just only the setpoint and the tag number. So, we provide a letters guide, and, also, this letters guide is developed by the Chapter 18, but we provide that letters guide, and we, also, a basic step of the EOP. So, this part of the actual EOP for the specific design is from the actual tag number and the setpoint.

MEMBER BLEY: Yes, I can understand. So, you will have like a shell emergency procedure and they will specialize anything that is particular to their plant at COL time?

MR. MASHIO: Yes. So, at some point, MHI provides a statement. But other operating procedures, such as normal operating procedures or standard startup and shutdown, this is normally each COLA applicant needs to develop.

MEMBER BLEY: Okay. At what point in this whole process between now and when the first COL applicant gets their approval do you expect the emergency procedures to be, the shell emergency procedures, the ERG, to be in place?

MR. MASHIO: This program is developed under the Chapter 18 part of the operating procedures development. And, yes, we developed, implemented in plant, how to implement, how to conduct the operating procedures development. And in this procedure, we provide writeups, general writeups guide. Also, we implement how to develop the operating procedures.

After creating the operating procedures, we conduct V&V, verification and validation, activity with our licensing operators. This is basically our approach.

Actually, the COLA operating procedures development schedule, this is our program for performance peak. We call this difference COLA. We provide the timeline of the operating procedures.

MEMBER BLEY: Okay, and we'll see that in Chapter 18?

MR. MASHIO: No, Chapter 13, COL, application document provides a timeline.

MEMBER BLEY: Will the ERG be in place before the actual design certification or is this not actually covered in the license? It is just something you will provide so the COL can get the procedures in place when they need them?

MR. MASHIO: Please again ask?

MEMBER BLEY: Will the ERG be written by the time you hope to have the certification in place?

MR. MASHIO: Yes, we did not commit to this organization of the design certification, but it depends on the construction schedule, and, also, we have some training guidelines, NEI 06-0138, which all pretty much material should be prepared 18 months prior to the pre-load. So, this material includes every operating procedure.

MEMBER BLEY: Okay. Go ahead, please. Thank you.

MR. MASHIO: And the next topic, the next section is 13.6, security. This section describes the COL applicant's responsibilities for developing a physical security program. Our physical security features are described which meet the performance requirements for 10 CFR 73.55(b).

And this is the last section, the fitness-for-duty. Also, the development of the fitness-for-duty program is the responsibility of the COL applicant.

The RAI summary: we received several RAIs for each section. The first, 13.2, training, we received a training program requirement. As I explained in the previous slide, we incorporate some insurance, how to develop that training program based on the NEI 06-0138.

And 13.3, emergency planning, we also received an RAI which related to the Technical Support Center floor space, power source, and the decontamination facility.

And we also in the RAI, the capability and the impact of the Main Control Room to accommodate TSC's plant management function.

CHAIRMAN STETKAR: Excuse me. I'm just wondering if we -- I don't recall seeing these technical reports. Have we received them?

MEMBER BLEY: I don't think so.

CHAIRMAN STETKAR: I don't believe so. I have a list here somewhere. I don't remember seeing anything on emergency planning.

The specific technical reports that were prepared correctly is an RAI response?

MEMBER BLEY: They are the responses to the RAIs.

CHAIRMAN STETKAR: Okay. They are not

separate technical reports. Okay. I misunderstood. Okay. Thanks.

On this slide, I had a few questions about 13.3. I waited until we got here.

In the DCD, and as part of the response regarding floor space in the TSC and the Main Control Room, there is a discussion that says that part of the emergency plan has to account for relocation of the plant management function from the Technical Support Center to the Main Control Room if the technical Support Center is not habitable.

And part of that discussion notes that the nominal number of people for that plant management function is apparently eight. It is three licensee personnel plus, apparently, five NRC personnel. And they apparently will relocate from the Technical Support Center to the Main Control Room.

In the response, it says that the Main Control Room has a total floor area of approximately 2,250 square feet, and there is an adjacent support room of similar size that contains an operator area, shift supervisor's office, clerical space, kitchen, and restrooms.

My question is, if I'm performing the plant management function, I am probably not doing that from the kitchen and the restrooms. In the design, is there adequate space available and allocated outside of the main control operating area? If I'm an operator, I do not want anyone inside my control space performing these plant management functions.

MEMBER BLEY: Which is exactly where the Technical Support Center came from after TMI, yes.

CHAIRMAN STETKAR: So, I don't want to relocate these eight people to the Main Control Room area, where the control boards or the operators or the shift supervisors are performing their functions.

In the design, is there adequate space available outside of that control space for these eight nominal people and, if so, where is it? It's not in the kitchen or the restroom.

(Laughter.)

MR. MASHIO: This DCD picture, in the Main Control Room, or adjacent to that --

CHAIRMAN STETKAR: Yes, we don't have those pictures. They were excised from the copies that we have --

MR. MASHIO: Oh, okay.

CHAIRMAN STETKAR: -- because they are safeguards information.

MR. BYWATER: No, they're not safeguards information.

CHAIRMAN STETKAR: Well, I mean we just didn't get them for some reason.

(Laughter.)

"This page intentionally blank" or something like that.

I guess the question I have, if you can give me assurance that, indeed, there is adequate space available outside of the main, I usually call it "the horseshoe", but the Main Control Room operating area --

MR. BYWATER: To not interfere with plant operations?

CHAIRMAN STETKAR: To not interfere with plant operations, such that zero --

MR. BYWATER: Allowing those people to have control room access that is in place where they can conduct their business and not interfere with the operators.

CHAIRMAN STETKAR: Yes, essentially, a large enough room off to the side somewhere that is supported by the Control Room HVAC. You know, it has to have all of the environmental --

MEMBER BLEY: And communications that they require.

CHAIRMAN STETKAR: -- and communications.

MEMBER BLEY: I mean it was the disaster in the Control Room at TMI with people interrupting operations, taking away recordings --

CHAIRMAN STETKAR: Absolutely.

MEMBER BLEY: -- and data that led to this whole concept of a TSC.

CHAIRMAN STETKAR: And in terms of planning, you don't want to have to plan to bring people back into that environment, especially because whatever disabled, whatever makes the TSC uninhabitable is probably not a good day at the nuclear power plant situation.

You may want to take that as a takeaway, if there is not a quick answer.

MEMBER BROWN: Where did you say the pictures were excised? I didn't see any pictures in Chapter 13.

CHAIRMAN STETKAR: Well, there are some drawings that are referred to in Chapter 13 that apparently have layouts of different parts of the building.

MEMBER BROWN: Yes.

CHAIRMAN STETKAR: That's what my

assumption was.

MEMBER BROWN: But I didn't see any figures --

CHAIRMAN STETKAR: There aren't. There aren't.

MEMBER BROWN: All right. So, I have not missed -- okay.

CHAIRMAN STETKAR: There may be a drawing of the Main Control Room area in another chapter of the DCD, but I didn't take the time to go look for it.

MEMBER BROWN: There's a cartoon somewhere else. It shows the screen layouts and --

CHAIRMAN STETKAR: No, no. This would be the floor plan of the --

MEMBER BROWN: Oh, the floor plan? Okay. No.

CHAIRMAN STETKAR: It is essentially the area that would be controlled by the Control Room habitability because it is not just floor space, but people have to have, they have to breathe, cooling, you know.

MEMBER BROWN: I thought we had something on that, John.

CHAIRMAN STETKAR: I don't know. I didn't go look for it specifically.

If you don't have a quick answer, this could be one of the takeaways.

MR. REYNOLDS: It definitely will be a takeaway. What we see is that other side that is equally in size to the Main Control Room will be divided into having the kitchen area and workspace.

CHAIRMAN STETKAR: Yes. It was mentioned that it was a workspace. I just didn't know how that was configured.

MR. REYNOLDS: That is probably not finalized as far as what the size is. But that area is set aside for that purpose.

CHAIRMAN STETKAR: Okay.

MR. REYNOLDS: We will make sure that that is a proper and appropriate size.

CHAIRMAN STETKAR: And is that exterior area also serviced by the Control Room whatever you call it, the Control Room habitability systems --

MR. REYNOLDS: I believe that whole area --

CHAIRMAN STETKAR: -- HVAC and isolation --

MR. REYNOLDS: -- is all part of the --

CHAIRMAN STETKAR: It's usually Control Room habitability area or something like that.

Okay. We will put that down as a takeaway.

Another question that I had, and that relates to the Technical Support Center power source. As I understand it, the power supplies for the Technical Support Center are from permanent buses P1 and P2. Is that correct?

MR. MASHIO: We need to check about that. I believe that's correct.

MR. BYWATER: I don't know the answer to that question. We will have to look it up.

CHAIRMAN STETKAR: Okay. The question I had is there's a statement, and I'm quoting from the SER. So, you'll have to excuse me because I'm taking your response to a staff question that has been recharacterized in the SER. So, sometimes things are lost a little bit.

It says, "Each uninterruptible power supply has two AC input power sources from non-Class 1E P1 and P2." That's where I got that from.

It says, "Even if both AC input power sources are lost, the UPS units can keep supplying output power by direct current back-up power from non-Class 1E 125-volt DC systems for 30 minutes without interruption of power to the loads."

This morning we heard that the non-Class 1E batteries were sized for one hour. And my question is, is this just simply a difference in the times between two sections of the DCD, where in the electric power section there's assurance that the non-Class 1E batteries will supply loads for 60 minutes, which gives you time for switchover of the AAC gas turbine generators? Here it said 30 minutes.

So, the question I had was, if this really means 30 minutes, does that mean that I shed the Technical Support Center after 30 minutes or is there really sufficient battery capacity to handle both the in-plant loads and the Technical Support Center for one hour?

MR. BYWATER: No, we don't know the discrepancy in that.

CHAIRMAN STETKAR: Okay. We will put that down. Put that down on your list of questions then.

I hope it is just an editorial issue, but if, indeed, there is some type of limitation on the length of the battery and you're dropping the Technical Support Center after 30 minutes for some reason, then it might not be useful going there in the first place.

And that is all I had on this one, I

think. Oh, and this also: when you are talking about floor space in the Technical Support Center, this may be simply an editorial issue. In Section 13.3 of the DCD, it states that, "Working space without crowding for personnel assigned to the Technical Support Center at the maximum level of occupancy is approximately 75 square feet per person."

And then it says, "The Technical Support Center working space is sized for a minimum of 25 persons, including 20 persons designated by the licensee and five NRC personnel."

If the working space for 25 people is 75 square feet per person, the total working space is 1,875 square feet. The question I had is, is it sized for -- is that number of square feet a size for the maximum capacity of the Technical Support Center is 25 people or is it the minimum capacity, as it is stated? If the minimum is 25 people, what's the maximum and how big is the floor area? You know, is it a million square feet? I can handle 25 people being the maximum, but I was just curious whether this statement about a minimum of 25 persons --

MR. BYWATER: No, a minimum of 25 persons.

CHAIRMAN STETKAR: That may be editorial. It sounded to me as if it was editorial, but I just wanted to make sure that I wasn't misinterpreting something. I am less well-versed on all of the guidance on these things, so I didn't know whether the guidance says it has to accommodate a minimum of 25 people or whether it just says a certain complement of people.

MEMBER RYAN: That's 75 square feet apiece or something like that.

CHAIRMAN STETKAR: Well, it is 75, yes. But, on the other hand, if the minimum is 25, what's --

MEMBER RYAN: Yes.

CHAIRMAN STETKAR: If the maximum is -- this is a big building if it's the max -- that's all.

MEMBER BLEY: I will bet it should have said, "at least", yes.

CHAIRMAN STETKAR: No, it shouldn't say, "at least". It should say, "a maximum of...." You can't have more than 25.

MEMBER BLEY: Should be big enough to hold at least, that's the same thing.

CHAIRMAN STETKAR: Never mind.

MEMBER BROWN: John, there is a figure in their HSI topical report which shows a typical layout of the Main Control Room, and there's some scaling.

Now there's only two doors out of it, and I can't --

CHAIRMAN STETKAR: Yes, but that is just the Control Room envelope, right?

MEMBER BROWN: I understand, just the Control Room.

CHAIRMAN STETKAR: I'm looking for what's --

MEMBER BROWN: And there's two doors, one on each side, and they don't show anything that goes after that. And, no, I couldn't find any other figure in the other --

CHAIRMAN STETKAR: I took a quick look, and I couldn't find it. We will just leave that on the table and see what comes back.

MR. BYWATER: Okay. We can take that as a followup. But I believe that the TSC should be sized for a minimum of 25 persons, including 20 licensee staff and five NRC personnel. I don't think you want the TSC sized less than that.

CHAIRMAN STETKAR: No, but the question is, how much larger does it need to be? Because the statement says that I have 75 square feet per person at the maximum occupancy.

MR. BYWATER: I understand.

MEMBER BLEY: Yes, I think it is just

language.

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: I think what it is saying is that the minimum size of the room has to handle --

CHAIRMAN STETKAR: Twenty-five people.

MEMBER BLEY: -- that many people. Yes.

CHAIRMAN STETKAR: If you try to put more in there, you get less than 75 square feet per person, which would be okay.

MEMBER BROWN: Well, but it kind of bounds it on the other end. It says, if you are going to put more in there, if they are going to anticipate more, they are going to have to make it bigger.

CHAIRMAN STETKAR: Well, I was trying to figure out how big. I started on this trying to figure out how big it might be.

MEMBER BROWN: Yes.

CHAIRMAN STETKAR: You know, are we talking about a closet or are we talking about a gymnasium?

MEMBER BLEY: But let them clarify it.

CHAIRMAN STETKAR: They can clarify it. I am sure this one is easy.

Thanks. You can continue on this.

MR. MASHIO: We also got an RAI regarding

Section 13.5, operating and emergency operating procedures. This RAI also provides some guidance on how to develop the operating procedures and we added a brief description in this section.

13.6 is security. We have three RAIs, but each contains a similar RAI, but we received three major RAIs.

CHAIRMAN STETKAR: On security, I have a few questions on security also. And here's an area where, if we are getting close to the margins, I am willing to be quiet. But I will try to keep it to information that I could derive from the DCD and the SER.

The first question is the identification of vital equipment. There is a statement that says -- and this, again, is from the SER -- there is a technical report number that is a long number. "The applicant considered in this technical report probabilistic risk assessment and risk insights from fire and flood assessments for the identification of vital equipment."

Then, the first assumption that is noted is assumption one. "Vital equipment is limited to safety-related components."

My question was, has the PRA identified

any non-safety-related equipment that is risk-significant that should be included within the scope of vital equipment to be protected?

Because you say you use the PRA to inform this list. The PRA looks at safety and non-safety equipment equally. But the first assumption that you use in terms of developing the protection strategies is that you will only protect safety-related equipment that is determined to be vital.

MR. REYNOLDS: Right.

CHAIRMAN STETKAR: So, the question is, is there other equipment identified by the PRA that may be as important from a plant risk mitigation perspective? And how was that -- well, apparently, it wasn't considered, but if that is the case, how was the PRA input for that non-safety-related equipment considered or just simply discounted?

MR. REYNOLDS: The non-safety-related equipment that we looked at, when we were looking and developing the vital equipment that would eventually become target sets and different target elements, I don't believe we credited any non-safety-related equipment in our strategy that I can recall. I was trying to think through it.

We have gone through the PRA and other

reports to, again, like you said, inform the process. And there may have been some that were identified maybe, but not credited as a target element through the process.

So, I'm trying to think, but I can't recall of any non-safety-related items.

CHAIRMAN STETKAR: You are saying that you didn't find any --

MR. REYNOLDS: Right.

CHAIRMAN STETKAR: -- that were --

MR. REYNOLDS: That were essential for shutdown.

CHAIRMAN STETKAR: That were essential for survival?

MR. REYNOLDS: Right.

CHAIRMAN STETKAR: Okay.

MR. REYNOLDS: They would be --

CHAIRMAN STETKAR: No, I understand. I understand that process. I was just curious, you know, because there was emphasis in two or three places to using results of the PRA to inform this process.

MR. REYNOLDS: Right. Sure.

CHAIRMAN STETKAR: Okay. In the area of target sets, there's an assumption, and I will quote it. It says, "Multiple trains of similar equipment at multiple locations throughout the plant must be made inoperable to prevent critical plant shutdown functions."

This is an example with one train out of service for maintenance during power operations, US-APWR. "Design has sufficient redundancy to accommodate protective strategy developed in this report without having to focus on how equipment maintenance or plant configuration needs to be accounted for in the target set analysis." So, this is basically saying that there is spatial separation between multiple redundancies.

Now the scope of the analysis has to account for all operating modes. So, therefore, it has to account for shutdown conditions when you may be allowed to have multiple trains of equipment out of service. I haven't looked at the shutdown technical specifications. I don't know what they look like.

How was that factored into your identification of the target sets? In other words, in principle, if I could have three divisions out of service during shutdown, my task for identifying target set locations is a little bit different because I can't take credit for this fact that I have spatial separation of at least two divisions.

MR. REYNOLDS: Right. We looked at all the trains in all modes of operation. We developed a shutdown matrix that we have added to our technical report and provided that to the NRC.

CHAIRMAN STETKAR: Okay.

MR. REYNOLDS: In that report, it assures that we have at least one train operable to obtain or maintain shutdown of a plant. And Shinji, earlier in Chapter 8, Shinji kind of alluded to that, that you know you need two trains generally, but there are some cases where we need one train.

And in a security event, we found that generally the one train we could achieve shutdown. So, the matrix goes through, and it is very detailed, it goes through every mode of operation and looks at the primary systems and their secondary systems and the back-up system.

CHAIRMAN STETKAR: And you said that matrix is in a technical report that --

MR. REYNOLDS: That is correct.

CHAIRMAN STETKAR: -- was submitted to the staff? Okay. Good. Good. Good.

The other question that I had is somewhat related to that. So that, I'm not going to ask that one.

So, thanks. Good. Thank you.

MR. REYNOLDS: You're welcome.

MR. MASHIO: Okay. So, we have a summary.

Chapter 13 provides information relating to the preparation and plans for the design, construction, and the operation of the US-APWR plant.

And the purpose of Chapter 13 is to provide adequate assurance that the COL applicant establishes and maintains a staff of adequate size and technical competence and that operating plants will ensure public health and safety is maintained.

All RAIs have been submitted by October 20, 2010.

That's all I have.

CHAIRMAN STETKAR: Good. Any other questions from any of the members?

(No response.)

Thank you very much.

MR. MASHIO: Thank you.

CHAIRMAN STETKAR: We appreciate it.

Let's have the staff come up and give us their summary.

Put up your name tag, but be aware that it may migrate. The ventilation system tends to want to blow it into the center. See.

(Laughter.)

I keep joking with the budget cutbacks that about January or so the ventilation won't work anymore.

(Laughter.)

You know, we'll solve that problem.

I'm ready when you are.

MR. TAKACS: Oh, okay. I'm sorry. I was waiting. Okay.

Good afternoon, everybody.

My name is Mike Takacs. I'm the Chapter PM for Chapter 13, Conduct of Operations. I will be providing most of the overview of the Safety Evaluation.

Assisting me today is Ed Robinson. He will be discussing the emergency planning portion of the Safety Evaluation.

I assume I'm doing this here, huh?

MR. HAMZEHEE: Do you need help?

MR. TAKACS: No, I think I can do it here. Yes. Okay.

As far as the Chapter 13 SE, as we all know, it is divided into seven sections. This slide here points out who the tech staff were or are that provided the input, the review of the DCD, and the input into the SE. Okay, Ed Robinson is the fourth person on that list.

Myself, Mike Takacs, is the Project Manager for the chapter.

Many of you know Jeff Ciocco. He is the lead PM for the project for the review.

Okay. Here were have the table. This provides all of us with a snapshot of all the questions that were provided to Mitsubishi for all seven subsections, and the total number of questions along with the open items remaining.

Now one thing I want to point out on here, as you can see, security, as we mentioned in the beginning of the meeting this morning, we won't be presenting security at this meeting. However, as you can tell, there's 129 questions for security, and the open items for the SE, there are eight open items only related to security. As of October, we did receive two technical reports, SGI documents, that should or the plan is to help close out those eight open items for the SE. Okay?

MEMBER BROWN: Is that physical security only?

MR. TAKACS: Yes.

Okay. What I captured here, we talked about physical security, 13.6, which leaves us with six subsections of 13. Here what I did is I placed the five -- there are five sections here, and you heard it from Mitsubishi:

Organization structure, training, operational program implementation, plant procedures, and fitness-for-duty. All of this information in the DCD is COL-specific predominantly, COL-specific information. The staff does agree that this information will be the responsibility of the COL applicant. Okay.

So, this leaves us with just one section for technical discussion, emergency planning. And with that, I am going to turn this over to Ed Robinson for emergency planning discussion. Ed?

MR. ROBINSON: Good enough. Let me first begin by saying good afternoon to you all, ACRS staff, NRC staff, members, and those members of the public who are here or perhaps calling in on a bridge line.

My name is Edward Robinson. I am an EP Specialist in the Office of NSIR in the Division of Preparedness and Response, and on the New Reactor Licensing Branch.

I had primary review responsibility for

SER Section 13.3 titled, "Emergency Planning" of the submitted US-APWR Design Certification Document. With that being said, I will go ahead and start.

Bullets 1 and 2, no open items or no confirmatory actions. As mentioned earlier in the staff's presentation, slide No. 4, there were total of four RAIs requested by the EP staff. These RAIs pertained to TSC floor space, TSC back-up power capabilities, the presence and availability of decontamination facilities, and the capability of the Main Control Room to accommodate the transfer of the TSC plant manager and function, should the TSC become uninhabitable.

The staff's technical review determined that the applicant's RAI responses were acceptable and consistent with the guidance identified in NUREG-0800 and the applicable regulations referenced therein.

Therefore, there are not any open items nor any confirmatory actions associated with SER Section 13.3 and, therefore, the staff is not expecting any updates, future updates, by the applicant to their FSAR pertaining to this section.

Bullet No. 3, the DCD satisfies TSC size and location. The staff's evaluation of the US-APWR application submittal concluded that the proposed size and location of the TSC was acceptable. The staff found that the TSC size and location descriptions provided by the applicant were in conformance with the guidance identified in NUREG-0800 and, therefore, consistent with the requirements set forth in 10 CFR 50.47(b)(8) and Section 4(E)(8) of Appendix E to 10 CFR Part 50.

In part, the applicant stated that the TSC contains a floor space of at least 1875 square feet. So, I think that answers your last question of at least 1875.

MEMBER BLEY: But what about the other question?

MR. ROBINSON: The TSC --

MEMBER BLEY: Are you comfortable with this idea of relocating the TSC to the Main Control Room and, if so, why?

MR. ROBINSON: Well, first, NUREG-0696, titled "Functional Criteria for Emergency Response Facilities", provides guidance to the staff as far as the amount of space at minimum.

Part of that guidance also talks about transferring the TSC plant management function to the Control Room, should the TSC become uninhabitable during an emergency event.

As far as looking at the Main Control Room from the EP perspective of the review, we did not cover that. I want to say -- and Mitsubishi could probably correct me if I'm wrong on this -- I want to say the TSC overall square footage was sized over 2,000 square feet. I want to say close to 2100, which would accommodate the additional five NRC personnel plus I think additional three licensee personnel.

However, from an EP perspective, we were only looking at TSC floor space and size.

MEMBER BLEY: Yes, from EP, I understand that.

MR. ROBINSON: Yes, from EP.

MEMBER BLEY: Did staff only look at it from an EP perspective or did you also look at it from a safety perspective inside the plant?

MR. ROBINSON: I would probably, from a safety perspective, whether the Main Control Room could probably accommodate the TSC, well, additional staff in general, I want to say that is going to be addressed to the ACRS staff in Section, I would say probably 9.4.1 and 6.4.

The reason I say that is 6.4 deals with Control Room habitability and 9.4.1 deals with Control Room area ventilation.

MEMBER BLEY: But it is not an issue of habitability; it is an issue of control of the plant during accident conditions, which is the reason there was an TSC in the first place. So, I'm just kind of curious why you guys didn't think about that one.

MR. BARSS: This is Dan Barss. I'm the team leader for the New Reactor Licensing Branch for New Reactor Licensing Emergency Plan.

And, Eddie, correct me if I'm wrong, but we did see the diagrams that show the Control Room and this auxiliary room with this additional space that is there. I believe it is in Section 12 is where we saw those diagrams.

MR. ROBINSON: Yes, it is in 12.3.11.2 is where the diagram I believe is.

CHAIRMAN STETKAR: That's the DCD?

MR. ROBINSON: That's of the DCD, that is correct.

MR. BARSS: Eddie, it was our impression that there was enough room there for the three people that would be transferring.

MEMBER BLEY: So, you saw them as not actually being in the Control Room, but as being in the separate space there?

MR. BARSS: In the separate space in that area, which is right there or adjacent, connected by the doorways that you were seeing in the one diagram in the TR report, I think.

So, from our perspective, we were comfortable that this relocation could occur, that there would be enough room for them to be in there without hindering the operators from performing their functions.

MEMBER BLEY: Okay. Go ahead.

MR. ROBINSON: This provides a workspace of approximately 75 square feet for each of at least 25 personnel, 20 licensee personnel plus an additional five NRC personnel, in addition to space for data system equipment and document storage.

The applicant also explained that the TSC is located near the Main Control Room within the access building, and the walking distance between the two facilities does not exceed two minutes.

MEMBER BLEY: I'm sorry, we were just thinking of trying to find blank spaces where those figures would be that you --

CHAIRMAN STETKAR: My figure looks an awful lot like security-related information withheld under 10 CFR 2.390. It's a nice picture.

(Laughter.)

MR. ROBINSON: Well, I'm talking of -- Mitsubishi would probably be the best to understand their Design Certification Document --

CHAIRMAN STETKAR: Yes.

MR. ROBINSON: -- where that diagram is located.

CHAIRMAN STETKAR: Well, I think it is probably where you referred us to. It is just that me, for example, can't see it.

(Laughter.)

MR. ROBINSON: Now I did want to point out to your ACRS staff members, within the SER that I believe EP provided to you all, the SER states that the TSC is in the auxiliary building. I'm not sure if you guys saw that.

CHAIRMAN STETKAR: Yes.

MR. ROBINSON: But it's actually in the access building. And I can tell you that is the correction that we are going to have to make.

CHAIRMAN STETKAR: Yes, I saw that discrepancy.

MR. ROBINSON: Yes, so I just wanted to point that out to you.

CHAIRMAN STETKAR: But it is in the access building. Okay.

MR. ROBINSON: It's in the access building. It was just Mitsubishi did a change of the TSC location from the Rev. 1 to Rev. 2. So, we just need to update it in our next revision to you all, which will be the SER with No Open Items.

CHAIRMAN STETKAR: Ed, is there some significance -- I noted in the DCD they made mention of the fact that the transit time between the TSC and the Main Control Room was less than or equal to two minutes.

MR. ROBINSON: Yes.

CHAIRMAN STETKAR: Is there some significance to that? Is that a requirement?

MR. ROBINSON: It is a design-related requirement coming out of 0696 --

CHAIRMAN STETKAR: Okay.

MR. ROBINSON: -- which specifies that's where it is coming from.

CHAIRMAN STETKAR: I was just curious, you know, why two minutes was magic.

(Laughter.)

MR. BARSS: Yes, I'll step in here. Dan Barss again, team leader.

Yes, the guidance in NUREG-0696 says two minutes.

CHAIRMAN STETKAR: Two minutes?

MR. BARSS: That was guidance in 1981.

CHAIRMAN STETKAR: Yes, I assumed that it was in guidance because there would be no other reason to specify that.

MR. BARSS: Yes. Well, interestingly, the next guidance that comes out a year later is 0737, Supplement 1 to that, and it doesn't mention the two minutes there. It just says it should be closer. I think the words are "within the site protected area".

And subsequent to that, the staff, when we prepared the Standard Review Plan, NUREG-0800, in preparation for these newer reactors, the staff came to the conclusion that, yes, the two minutes was important in 1980 and 1981, but with the advanced communications capabilities we have, the data systems that we have, and that we expect for these plants today, that two minutes is not really that essential.

CHAIRMAN STETKAR: But, in practice, though, because it is in this Design Certification Document, Mitsubishi has committed to a two-minute transit time.

MR. BARSS: That's correct.

CHAIRMAN STETKAR: Which must apparently be verified by the COL applicant.

MR. BARSS: Now remember, though, too, that this is a space suitable for TSC. The COL applicant is the one responsible for telling us where they want their TSC to be. It may not be in this space. It may be somewhere else.

CHAIRMAN STETKAR: But suppose they decide to put the TSC, you know, a quarter of a mile down the road in an appropriately-bunkered facility that is obviously not accessible within two minutes. Does that require the COL applicant to -- I have forgotten the legal term -- take an exception to the design certification? Because it specifically states in the DCD that it is two minutes.

MR. BARSS: I believe it is a Tier 2-level document.

CHAIRMAN STETKAR: Is it? Okay.

MR. BARSS: And I believe that that Tier 2, the applicant can make those changes without changing --

CHAIRMAN STETKAR: Okay, okay.

MR. BARSS: -- the design --

CHAIRMAN STETKAR: It's not a Tier --

MR. BARSS: It's not a Tier 1.

CHAIRMAN STETKAR: It's not a Tier 1 or a Tier 2* or anything? Okay.

MR. BARSS: So, somebody correct me if I am wrong on that, but I believe that is the case.

MR. ROBINSON: It's a Tier 2, the location of the TSC.

CHAIRMAN STETKAR: It is a Tier 2? Okay.

MR. ROBINSON: That's correct.

CHAIRMAN STETKAR: Okay. Thank you.

MEMBER BROWN: It is shown in a figure in the access building.

CHAIRMAN STETKAR: Yes, I think that's what they --

MEMBER BROWN: I think that is what he called out, and mine is not blanked out.

(Laughter.)

For the plan view, then, it is shown in the access building.

CHAIRMAN STETKAR: Which?

MEMBER BROWN: That's in Chapter 12, Rev. 2.

CHAIRMAN STETKAR: Yes.

MEMBER BROWN: Yes, Figure 13.3-2. It's on page -- hold on; I've got it blown up -- it's on 12.3-86, is the page number.

CHAIRMAN STETKAR: Okay.

MEMBER SHACK: That is the page of the

PDF. That is more useful.

MEMBER BROWN: That's what it is. Oh, the PDF page?

CHAIRMAN STETKAR: That's okay. No, I can search.

MEMBER BROWN: That's 220. Thank you.

CHAIRMAN STETKAR: Two twenty?

MEMBER BROWN: PDF page 220.

CHAIRMAN STETKAR: Wait a minute. Okay, we'll work this out later, but I am staring at that page, and my figure says, "Security-related information".

MEMBER BROWN: What does this look like to you?

MEMBER SHACK: It sure looks like a figure.

MEMBER BROWN: And it says, "Figure 12.3-2", and it's Rev 2 of the Chapter 12. It's underscored "SRI".

MEMBER SHACK: They know he's an old Navy guy.

CHAIRMAN STETKAR: It's a conspiracy. Okay.

(Laughter.)

MEMBER BROWN: Maybe it's because my badge is better than yours. I don't know.

CHAIRMAN STETKAR: I have a red stripe on mine. I apologize.

MEMBER BROWN: Mine's pink.

MEMBER RYAN: It's upside-down, too, Charlie.

MEMBER BROWN: Oh, it is?

MEMBER RYAN: Yes.

MEMBER BROWN: You're right. Well, that's the way I live, upside-down most of the time.

(Laughter.)

CHAIRMAN STETKAR: Neil, would you figure out how come he has a better copy of the DCD than perhaps I do or maybe the rest of us? Make sure that we all have at least equal --

MR. CIOCCO: Let's be clear. We have two versions of the DCD. We have a public and non-public version. The public version has all of the security-related information redacted. The SRI-included version, which may be what we see here, or shouldn't see, is the non-public version. And we provided both of those to the ACRS.

CHAIRMAN STETKAR: Apparently, some subset of us got one --

MEMBER BROWN: I have got two. One says,

"SRI"; the other one says, "SRI Non-Public", and that's the one --

MEMBER SHACK: I threw the public one away.

MEMBER BROWN: Yes, I probably ought to do that also.

MR. COLEMAN: I think everyone has both, but you got them at different times.

CHAIRMAN STETKAR: Okay.

MR. TAKACS: Can I ask a question on this? Mitsubishi, can I ask a question on that? Would they remove that diagram from the public view, the TSC?

CHAIRMAN STETKAR: Yes.

MR. TAKACS: Oh, they did? Okay.

CHAIRMAN STETKAR: I can guarantee that because I apparently have the public view, and I certainly don't have it.

MR. TAKACS: Okay.

MR. BARSS: And I believe -- and I won't speak for security -- but that is because of the access routes and things like that.

MR. TAKACS: Oh, okay.

MR. ROBINSON: All right.

CHAIRMAN STETKAR: I apologize.

MR. ROBINSON: No. I've just got SRP

interface. NUREG-0800 identifies various emergency planning reviewer interface areas that may have overlap in review responsibilities. The SER section interface area in which the EP staff has verified various TSC capabilities are addressed include SE Section 6.4, which provides information regarding the protection of the Main Control Room personnel during an emergency; SE Section 7.5, which provides information related to TSC data retrieval capabilities such as the safety parameter display system and emergency response data system; SE Section 9.3.2, which provides information pertaining to the post-accident sampling system; SE Section 9.4.1.

It provides the staff's determination of the acceptability of the TSC HVAC system, and that it functions in a manner comparable to that of the Main Control Room. SE Section 9.5.2, which discusses TSC voice and data communications equipment; SE Section 12.3, which discusses decon facilities onsite, and SE Section 15.3, which contains information relating to the TSC radiological habitability or those criteria outlined in GDC Criterion 19 of Appendix A, Defense CFR Part 50.

In general, programmatic aspects of emergency planning and preparedness are the responsibility of the COL applicant. That references the Standard Certified Design. However, the application may, but it is not required to identify such programmatic responsibilities as COL action or information items.

Within the US-APWR design certification, the applicant provided seven COL information items that are to be addressed by those COL applicants who choose to reference the US-APWR design certification. They are as follows:

Develop interfaces of design features with site-specific designs and site parameters.

Develop a comprehensive emergency plan as a physically-separate document.

Develop an emergency classification and action-level scheme.

Develop the security-related aspects of emergency planning.

Develop a multi-unit site interface plan dependent on the location of the new reactor on or near on, or near, an operating reactor site with an existing emergency plan.

Develop emergency planning ITAAC.

And finally, those COL applicants referenced in the US-APWR certified design are to provide a description of the OSC and those communication capabilities associated with that.

Upon the staff's review of Section 13.3 of the DCD, it was determined that the information provided by the applicant met the standards identified in NUREG-0800 and the regulations referenced therein. And therefore, the staff has found the information provided by Mitsubishi as it pertains to emergency planning acceptable.

That's it. So, if there's any questions, I can answer those. If not --

CHAIRMAN STETKAR: I had one.

MR. ROBINSON: Okay.

CHAIRMAN STETKAR: This is on Section 13.6, but it is in my version of the DCD and it's in the SER. So, I can discuss it.

Regarding the identification of target sets -- and for your reference, it is Section 13.6.4.2.3 of the SER -- there's a statement that says, "The applicant has eliminated target set groups based on non-conservative assumptions for limiting the target sets to a specifics time to core damage. This is contrary to the requirements to protect against significant damage in accordance with 10 CFR 73.1."

And I assume there's an assumption -- I'm assuming that statement relates to an assumption that says mitigating actions are available and can be successfully implemented for scenarios in which the time to core damage or spent fuel damage exceeds eight hours.

MR. HAMZEHEE: John, this is a security-related time. Because it is security, maybe we don't want to talk about it.

CHAIRMAN STETKAR: Okay.

MR. HAMZEHEE: Thank you.

CHAIRMAN STETKAR: I'll stop.

MEMBER BLEY: Another meeting.

MR. TAKACS: Oh, okay. Well, let me go ahead. Any questions on emergency planning while we're still there?

CHAIRMAN STETKAR: No, not now.

MR. TAKACS: Okay.

CHAIRMAN STETKAR: No, that's fine. Sometime I would like to raise the issue. It is a question of why there is not an open item related to this timing. So, you may just want to, without going into any more detail --

MR. TAKACS: Actually, it looks like our subject matter expert, Pete Lee, will be providing some answer to that.

CHAIRMAN STETKAR: As I said, anything that I am quoting is from something that I could find in a public version. So, it has not been redacted.

MR. LEE: Yes, may name is Peter Lee. I'm with the NRC. I'm the technical reviewer on the US-APWR design, also, the COLA.

I believe the question you are talking about does have an open item.

CHAIRMAN STETKAR: Does it?

MR. LEE: And it's --

CHAIRMAN STETKAR: I couldn't find one. So, my question is, why isn't there an open item? So, if there is, I'm happy.

MR. LEE: In the SER, we talk about target set, and Mitsubishi has indicated that that is an item that will be addressed by the COLA.

CHAIRMAN STETKAR: Yes.

MR. LEE: The COLA that references this --

CHAIRMAN STETKAR: Yes.

MR. LEE: -- design would have to address target set. But they do provide a section and information on target sets, how they went about the process to identify what are target sets are, and also the results from that process they applied.

We have RAIs to the applicant or who is

the COLA on the subject of addressing the completeness and accuracy of the target set to address what we discuss in the SER for the design cert.

So, it is not in the scope of the design cert, but we certainly reviewed it. And we basically stated that that would be an open issue and item in the SER that would have to be resolved by the COL applicant.

CHAIRMAN STETKAR: Well, my question was my understanding, without going into too much detail, was essentially the final -- and I think that is what I hear you saying, is that the final resolution of this issue was basically pushed to the COL applicant, that it is their ultimate responsibility for identifying the target sets.

MR. LEE: Right.

CHAIRMAN STETKAR: My question was, though, if in MHI's fundamental process -- they have already identified target sets, but if their list of target sets is based on non-conservative assumptions, is there a possibility that when the COL applicant completes that list, in other words, completes the target set identification process, ostensibly responding to your concerns about potentially non-conservative timing assumptions, could they identify conditions that are better mitigated by plant design changes, such that resolution of this specific source of non-conservatism, it may not be appropriate or best to put it off to the COL applicant?

MR. LEE: Well --

CHAIRMAN STETKAR: That was my basic question because I couldn't find an open item for the DCD.

MR. LEE: Right.

CHAIRMAN STETKAR: It basically says, well, it is the COL applicant's responsibility to complete the list of target sets, and we'll make sure they do that appropriately, essentially.

MR. LEE: Yes, and I guess let me step back, and what the purpose of the target set is to make sure that from the security perspective that they are protecting all the system function, and so on, as required.

So, when they make the assumption that we are not going to include a certain grouping based on that assumption, that would not show that we have the adequate protection at all times, 24/7. Because, basically, the regulation doesn't put a time limit on the requirement. So, therefore, we are going back to Mitsubishi in RAIs, and so on, to request somebody address that in the technical report, which would be incorporated by reference by the COLA when they say, "We're going to follow, basically, what Mitsubishi has identified as a target set."

So, if they correct it there, then that would be resolved to the COLA. But if not, then, that would certainly be an open item for the COLA when we write up the Safety Evaluation for that.

CHAIRMAN STETKAR: Well, you know, I understand that.

MR. LEE: Right.

CHAIRMAN STETKAR: My question is, though, not being intimately familiar with the actual process, and certainly not with the details of this specific design, when the COL applicant addresses this issue, is there a reasonable chance that the COL applicant could identify features that are better addressed at the design level? That could be the locations of specific items in the plant, which is a design COL applicant isn't going to move specific equipment from one location in the plant to another. The COL applicant isn't necessarily going to construct barriers of different types.

So, my question is, simply by saying, well, it's the COL applicant's responsibility and we'll finally determine that the COL applicant has adequately addressed this issue, is that just simply -- are we risking the fact that they might identify design features that are not adequate, that are better addressed in the design certification process for that target set? In other words, why are we essentially pushing it off?

MR. LEE: I guess I would need to understand the clarification on the design feature. Are you referring to the --

CHAIRMAN STETKAR: I don't know because --

MR. LEE: -- security design feature or are you talking about a safety system design configuration, and so on? Because, right now, all the information is based on the proposed design. And certainly now, in all the systems, and so on, as far as we understand, it is located within the power block of the nuclear island and structure, and the physical protection system that would be provided is a layer of protection that goes from the outer perimeter into the interior of the nuclear island and vital structures.

MR. HAMZEHEE: I think, John, let me just -- I am starting to feel uncomfortable. I don't know. Maybe I --

CHAIRMAN STETKAR: Okay. That's fine. We

can stop the discussion right now --

MR. HAMZEHEE: All right.

CHAIRMAN STETKAR: -- because I don't want to tread into areas that shouldn't be on the public record.

So, I think we have enough of a discussion here that -- think about it a little bit, and then --

MR. LEE: And what I said is basically in the regulation to provide defense-in-depth via physical protection systems. And none of what I have just said is going to SGI or the security-related information.

CHAIRMAN STETKAR: Okay. Thank you.

Sorry.

MR. TAKACS: Oh, that's okay.

Okay. To summarize the Evaluation, the Safety Evaluation, other than the eight open items in physical security, the staff here does find the US-APWR DCD acceptable in meeting the appropriate regulations that support those seven or six subsections.

Are there questions?

CHAIRMAN STETKAR: Any questions from --

MR. HAMZEHEE: John, I also wanted to clarify something. The questions you asked regarding the two-minute timeframe --

CHAIRMAN STETKAR: Yes.

MR. HAMZEHEE: -- and what if your applicant wants to change that, usually, the way the process works as of today is that, when an applicant comes in -- let's just talk about that specific example. If they are not okay with that two minutes and they would like to change it, they submit an application and they have a section called "Deviation".

CHAIRMAN STETKAR: Yes.

MR. HAMZEHEE: So, then, they define it. Now, if they don't and then they come in, and then we give them a license, then they decide to change it, there is still a process that they can follow.

CHAIRMAN STETKAR: Right.

MR. HAMZEHEE: Depending on the safety significance, they can ask for exemption, amendment, or they can do a 50.59-type process --

CHAIRMAN STETKAR: Yes.

MR. HAMZEHEE: -- to evaluate the safety significance and make the appropriate changes.

CHAIRMAN STETKAR: And as long as it's two minutes, it is simply a Tier 2 statement.

MR. HAMZEHEE: Right.

CHAIRMAN STETKAR: It's not a Tier 1.

MR. HAMZEHEE: And if it's Tier 2, then their own process for making changes --

CHAIRMAN STETKAR: Yes, yes, yes.

MR. HAMZEHEE: -- can be followed.

CHAIRMAN STETKAR: Okay. Thank you.

Any other questions for the staff by any of the members?

MEMBER BLEY: Well, not exactly what we have seen, but I had two areas, if I may. Or one's here.

We had a little discussion with Mitsubishi about the emergency procedures and how that process is working. Are the SAMGs in the same process? I don't remember reading about them, although it might have been. And have you guys seen anything so far on that?

MR. BARSS: First, the Severe Accident Management Guide is a voluntary process, not a regulatory requirement. So, that's one --

MEMBER BLEY: I guess I didn't know that.

MR. BARSS: Yes. And also, you need to divide or put a dividing line in. When you talk about emergency operating procedures, that's what the operators in the Control Room use to operate the reactor or to shut it down safely, whatever.

MEMBER BLEY: But since we have been talking about the TSC, I thought I would bring that up.

MR. BARSS: Yes. When you talk about emergency implementing procedures, EPIPs, emergency plan implementing procedures, those really don't have anything to do with safely operating reactors. They have everything to do with notifying the plant staff and the offsite facilities that we have a problem, and that you need to start thinking about taking protective actions for the public and communicating that information to the offsite authorities and then to the public and to the NRC.

MEMBER BLEY: Well, they deal with a lot more than that.

MR. BARSS: Well, yes, but they are two different realms. The EOPs deal with operating reactors. The emergency plan implementing procedures deal with implementing the emergency plan after you have had a problem with the reactor and the operating procedures support.

MEMBER BLEY: So, we have a licensing requirement to have a place for the TSC to live, but no requirement about what they do inside their little room?

MR. BARSS: Well, we do, and that's the emergency plan, and that comes at the COL stage.

MEMBER BLEY: Okay. The other thing I had a general question about which wasn't on the table today is we have -- because I wanted to ask about the PRA, just because, for me, that is a way to put all these mutable pieces together and a way to understand how they all interact.

We have Chapter 19. So, we know the summary of results, and it is a bigger summary than some we have seen. But it doesn't have any fault trees or anything like that in it.

In some cases, vendors have a technical report that includes much more of the PRA than you see in Chapter 19. Is there such a document, and does staff have it?

MR. HAMZEHEE: They have many, many supporting reports that support Chapter 19. And staff is working closely with MHI through all their site visits to go through all those detailed fault trees entries and all the --

MEMBER BLEY: Well, I know the actual model, you have to go there, but if there are topicals or technical reports associated with it, if you could provide us a list of some of those, so that we might be able to look through selected ones, I would find that helpful.

MR. CIOCCO: Jeff Ciocco with the NRC staff.

Are you referring to the PRA? I mean we do have the PRA in-house.

MEMBER BLEY: Yes, that's what I'm referring to. If you have the PRA in-house --

MR. CIOCCO: Level 1, 2, and 3 --

MEMBER BLEY: Yes.

MR. CIOCCO: -- that are proprietary that are --

MEMBER BLEY: Okay.

MR. CIOCCO: -- obviously, summarized, as you see --

MEMBER BLEY: But you actually have a report on it? Okay.

MR. CIOCCO: Oh, absolutely. It's submitted on the docket. You bet.

CHAIRMAN STETKAR: Well, do you have the fault trees and the event trees or just the summary of the --

MEMBER BLEY: Well, the event trees are in Chapter 19, actually.

CHAIRMAN STETKAR: The event trees? Oh,

I'm sorry, the fault trees.

MR. HAMZEHEE: What Jeff is talking about is a full probabilistic risk assessment. They are thousands of pages.

CHAIRMAN STETKAR: Okay.

MR. HAMZEHEE: If you like, we can just send you a copy.

MEMBER BLEY: We like.

(Laughter.)

MR. HAMZEHEE: All right. To all the members or just to Dr. Bley?

MEMBER RYAN: Everybody.

CHAIRMAN STETKAR: Provide it to Neil.

MEMBER BLEY: Provide it to Neil.

CHAIRMAN STETKAR: And he'll give it to those who need to see it and want to see it.

MEMBER SHACK: We should have an electronic version.

MR. HAMZEHEE: All right.

MEMBER SHACK: It's electronic?

(Laughter.)

MR. HAMZEHEE: Yes.

MR. CIOCCO: It's several hundred files of several hundred megabytes. It is enormous.

CHAIRMAN STETKAR: You cannot buffalo this group by volume.

(Laughter.)

You have no concept of the volume of pages of material. That's nothing.

(Laughter.)

MEMBER BLEY: Thank you.

MR. CIOCCO: You're welcome.

CHAIRMAN STETKAR: Anything else from any of the members?

(No response.)

Thank you very, very much for the presentation.

MEMBER BLEY: Something for you though --

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: -- before you close this meeting.

CHAIRMAN STETKAR: I'm not going to close it quite yet.

MEMBER BLEY: Okay.

CHAIRMAN STETKAR: I have a few other things that I need to do here.

First of all, are there any members of the public here who would like to make any comments or say anything?

(No response.)

No? Okay.

What I would like to do now, then, before we do close the meeting is, No. 1, go around the table as we normally do and see if any of the members have any specific items that you would like to make sure that we have on the list, any additional questions or comments.

No. 2, related to that, when I do that, do you feel that any of the issues that were raised during the meeting today warrant consideration by the full Committee in the sense of a possible interim letter to the staff? In other words, is there anything significant enough that would warrant an interim letter to the staff, meaning we have to schedule a full Committee presentation on those topics?

And then, finally, what I will try to do is summarize. As I said, we are trying to start an action item list here and make sure that we all have agreement on what those at least line items are in that action item list.

So, with that, Charlie, do you have anything?

MEMBER BROWN: No. I was thinking we would be doing more on the GTGs and expanding some of the information we discussed at the Subcommittee meeting a year and a half ago or so. I have nothing else, and I didn't see anything in this that would write an interim letter, is my own thinking.

CHAIRMAN STETKAR: Okay. Bill?

MEMBER SHACK: No. You know, I don't see anything that -- they're still working through issues, you know.

CHAIRMAN STETKAR: Mike?

MEMBER RYAN: I'm in the same boat as Bill and Charlie. I don't think there's an interim letter, but there's an action item list that is fairly healthy.

CHAIRMAN STETKAR: Yes, we will go through that in a moment.

MEMBER RYAN: If that gets attended, then, no.

CHAIRMAN STETKAR: Yes. Dr. Bley?

MEMBER BLEY: Nothing. I don't see any reason for a letter from us at this time. I do want to say I appreciated the presentations and discussion today quite a bit.

I was kind of astounded by the response curve for the diesel generator -- I'm sorry; the diesel -- the gas turbine generator to a 700 percent load. The response to that machine is astounding, and I want to see more about that. I guess there will be information on that in the report we have.

MEMBER BROWN: When you're done --

MEMBER BLEY: So, that goes a long way to helping giving me some confidence, but I would like to learn more about it.

An issue not directly for this design cert, but this idea that it was either 0696 or 0800 actually says you should relocate the TSC to the Main Control Room is something I want to dig into a little bit personally because that seem antithetical to the whole idea of the TSC. So, I want to understand that better, but that is not associated, I don't think, with this particular design cert.

So, that's it for me.

MR. BARSS: Can I just add, so that it is clear? You are not relocating the entire TSC staff. You are only relocating the few management members into the Control Room.

MEMBER BLEY: Only the management function?

MR. BARSS: Yes, only the management function.

MEMBER BLEY: Okay. I heard those words,

but I hadn't heard anybody stress it the way you're doing it.

MR. BARSS: Yes, that's all it is, is a management function. I think they indicated a total of three people is what they considered for their design in the management function.

And then, generally, across all designs and all plans that we review, it is only the management function that we are looking at moving there, and then the other individuals would have to go somewhere, and it is up to the applicant to decide where that facility is and where they would go.

CHAIRMAN STETKAR: I think, if I recall, it was they actually identified eight people that would be relocating. They said three licensee people plus five NRC people.

MR. BARSS: Yes, we don't expect them to speak for the NRC.

CHAIRMAN STETKAR: Well, but I mean, in terms of what they're specifying in the design, they are supposedly counting for the relocation of eight people into the Control Room envelope, and the other, I guess, nominally 17 people to some other licensee-specified location. I mentioned maybe the training center or something like that, but that's COL.

MR. ROBINSON: And, sir, I believe that's coming from Section 2.2 of 0696 --

CHAIRMAN STETKAR: Okay.

MR. ROBINSON: -- where they go into a little bit more detail as far as that is concerned.

CHAIRMAN STETKAR: Part of my concerns about this is not only from -- and I think Dennis shares it. No. 1, it's to be absolutely sure that that relocation does not introduce bodies into the space occupied by the licensed operators and the shift supervisory personnel because that is the lesson learned from TMI.

The second is -- and it is somewhat related -- that if, indeed, the support systems for the Technical Support Center are only reliable for 30 minutes, we are, indeed, going to challenge this relocation quite frequently for the events that are of any interest to mobilize the Technical Support Center.

So, therefore, this is not necessarily a rare event. But if the Technical Support Center is only habitable for a maximum of 30 minutes because of the longevity of the support systems, in the real world, people will say, "Well, it's getting awful warm in here and stuffy and we need to relocate."

So, this is not necessarily a rare event when we think about the types of scenarios that might cause problems in the plant and, also, disable some of the support systems for the Technical Support Center, if those support systems, indeed, are powered from the non-safety electrical supplies.

So, there's sort of a coupled issue there.

Anything more? Charlie, you had one?

MEMBER BROWN: When we do the February meeting, and it was relative to the table that showed the response to the 50 and 100 percent load, and the voltage drops are pretty large. They recover, but at least in my past experience we had some loads that, when you applied them like that, they would, if you had one second below that 6 or 7 percent or 8 percent, they would drop out, and then they may or may not recover, depending on the design. You don't want that to happen.

So, I don't want any answer now, but just discuss, if you could, the impact of those voltage drops on what you perceive as the loads that need to be stable and online and not drop back off as a result of the voltage drop.

CHAIRMAN STETKAR: Unfortunately, all of the electrical guys seem to have abandoned us.

(Laughter.)

I am assuming they will read the record.

MEMBER BROWN: Yes. Well, I didn't mean to try to go through that now because we are going to have that discussion later and explicitly related to the GTG operation.

CHAIRMAN STETKAR: Yes.

MEMBER BROWN: So, I would just like to hear something about that.

CHAIRMAN STETKAR: Okay.

MEMBER BROWN: Frequency and voltage.

CHAIRMAN STETKAR: Anything else?

(No response.)

What I would like to do, I have been trying to make notes on here. Let me just run down a laundry list of things that I have here that I will categorize as potential action items for us to have on our list.

If any of the members feel that these are not necessarily important enough for us to put on our list, let's not put them on the list. This is not something that I want to create hundreds and hundreds of items that then start to take on a life of their own.

The items that I have right now are whether or not the scope of underground cables includes low-voltage cables.

MEMBER BLEY: And unpowered cables.

CHAIRMAN STETKAR: And unpowered. Yes, in other words, whether the criteria set for this plant are consistent with the criteria that are being applied in the GALL report. Is that reasonable to put on our list? Okay.

The second one I have is the survivability of the reactor coolant pump seals for one hour during station blackout conditions. That gets into whether it's .2 gpm or 25 gpm, or whatever the basis for that is.

Is that --

MEMBER BLEY: Well, we want to see that, but I think that comes up, really, when we get to the chapter on pumps.

MEMBER SHACK: But it is still an action item; that's all.

MEMBER BLEY: But it's still an action -- but we won't lose it then.

MEMBER BROWN: Yes, but they are also waiting for an answer to a --

CHAIRMAN STETKAR: Yes, but I want to make sure it's -- some of this action item stuff is almost like a tickler file a bit for us, also, to make sure that we don't drop it when we get to the later chapters, because the later chapter reviews are extended out in time.

The question about heatup of the Class 1E electrical rooms with no ventilation, is that worth tracking or are we going to naturally find that later?

MEMBER BLEY: Keep it on there as a single item because I don't remember if it is in their PRA, but that is where it would really show up.

MEMBER BROWN: Are you talking about just the switch gear? I mean like the switch gear with circuit breakers, or are you talking about instrumentation controlled electrical rooms? I mean, or did you --

CHAIRMAN STETKAR: All of the above.

MEMBER BROWN: All of the above?

CHAIRMAN STETKAR: All and/or any of the above, depending on what the --

MEMBER BLEY: If it's got the INC stuff in it, I definitely agree with it.

CHAIRMAN STETKAR: It has got the INC stuff in it.

MEMBER BLEY: Okay. Then, I agree with holding it.

CHAIRMAN STETKAR: It has got the INC

stuff. So, we will keep that one.

The fourth one -- and I think this is a separate line item, but it will probably roll up into the general gas turbine generator.

Dennis, you mentioned that we would like to see that Interim Staff Guidance, ISG-21?

MEMBER BLEY: Yes. Yes.

CHAIRMAN STETKAR: Okay.

MEMBER BLEY: Now the thing I wonder is, do we want to have that on your big file or do we want --

CHAIRMAN STETKAR: Probably not. Just --

MEMBER BLEY: -- that as a separate thing? I mean it has got broader applicability than just this plant.

CHAIRMAN STETKAR: Oh, you mean a separate Subcommittee meeting on it?

MEMBER BLEY: Not necessarily, but we ought to take a look at it. Keep it on there.

CHAIRMAN STETKAR: Is this ISG -- I haven't looked at it -- is this ISG strictly for gas turbine generators?

MR. HAMZEHEE: Yes.

CHAIRMAN STETKAR: If it is, we are the only ones that care about it. I mean none of the other design centers care about it.

MEMBER BLEY: Care about it, at least now, yes.

CHAIRMAN STETKAR: So, it's --

MEMBER BLEY: Okay.

CHAIRMAN STETKAR: It either comes under this Subcommittee or it --

MEMBER BLEY: No, you're right.

CHAIRMAN STETKAR: -- doesn't.

MEMBER BLEY: You're right.

MR. HAMZEHEE: And, John, just for your information, it is almost in the final stage.

CHAIRMAN STETKAR: It is?

MR. HAMZEHEE: We sent it out to NEI and industry for comment. We received something back, and we are almost done with it.

CHAIRMAN STETKAR: When do you -- well, we can talk offline --

MR. HAMZEHEE: Yes.

CHAIRMAN STETKAR: -- about getting it in, whether it is the February timeframe or whatever.

The next one is a bit gray for me. What I wrote down was this general notion of the two-out-of-four success criteria. Do we want to, for all design-basis events, do we want to track that or is that basically a PRA?

MEMBER BLEY: I think that is a PRA action.

CHAIRMAN STETKAR: Okay. Let's handle it --

MEMBER BLEY: And it will come up without --

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: We won't have to have it on your list.

CHAIRMAN STETKAR: Yes, we'll handle it, yes.

MEMBER BLEY: The other side of that is assurance in the design-basis case that, in fact, any two-out-of-four is okay, and that comes up under Chapter 15, I guess.

CHAIRMAN STETKAR: That should come up under Chapter 15.

MEMBER BLEY: I don't know if we will think of it at that point. So, restricting it to the design basis might be a good item to keep on your list.

CHAIRMAN STETKAR: Yes, but I mean that's an accident-by-accident analysis.

MEMBER BLEY: You're right, and staff said they didn't really chase it because they are under the --

CHAIRMAN STETKAR: I won't forget it.

MEMBER BLEY: Okay.

CHAIRMAN STETKAR: I have my own little tickler file that I keep.

MEMBER BLEY: Well, let me just say this out loud once. They said they won't chase it because under single failure they didn't have to, but if you have one out of service, and then you've got a single failure, that could leave you with any two buses, arbitrarily any two.

CHAIRMAN STETKAR: Well, the problem is not exactly because, if I realign those things with --

MEMBER BLEY: No, I understand.

CHAIRMAN STETKAR: -- with the out-of-service --

MEMBER BLEY: You could pick up some loads, yes.

CHAIRMAN STETKAR: -- you'll pick up those other loads. It's only the 6.9-kV stuff that you don't pick up.

I'll make a note of it because I have some things that are rolling from one chapter to another chapter.

The question that came up this morning about the LOOP and LOCA sequencing of the power supplies, you know, can we get into multiple cycles of the 6.9-kV circuit breakers, is that worth --

MEMBER BROWN: To me, if it is recognized, that ought to be -- the important thing is you make sure, if you lose power and you get power back, that you actually recycle and stuff restarts, and will it restart, and the nature of the loads.

I mean if you start certain types of motor loads, in coast-down conditions you can put some fairly heavy transients on those motors, and you can actually damage them such that they will not sustain their functionality.

CHAIRMAN STETKAR: That's true.

MEMBER BROWN: That is a real concern. So, that is the reason -- I don't like the idea of cycling. I mean, to me, I would dump everything and start it all and then go with it, but that's not the way it looks like it is being done.

CHAIRMAN STETKAR: A lot of plants, typically, that is what happens. I don't know if I have ever seen one like this, but I haven't thought about it. It is kind of a unique feature of the fact that they keep the generator output breaker closed for

15 seconds. I mean that's a lot. We're not talking about 15 cycles. It's 15 seconds.

MEMBER BROWN: Yes. Yes, I would have tripped that along with the throttle valves, or whatever.

CHAIRMAN STETKAR: I understand. I know why they do it. It is that they need power for other things.

MEMBER BROWN: Well, the question is, where do you get out of it? If the coasting-down voltage -- when does someone take --

CHAIRMAN STETKAR: No, they claim that the 15 seconds they will maintain enough voltage on those buses, at which point --

MEMBER BROWN: Well, it's possible because it is a giant generator --

CHAIRMAN STETKAR: Yes.

MEMBER BROWN: -- and the loads are relatively small.

CHAIRMAN STETKAR: The question right now is, should we keep this on our list of action items to follow up on?

MEMBER BROWN: You know, if it actually happens, and it's got to restart, and stuff is not supposed to break --

CHAIRMAN STETKAR: I'm looking for guidance here.

MEMBER BROWN: I have mixed emotions on that one because I don't like the approach.

MEMBER SHACK: Well, they're not going to change it.

CHAIRMAN STETKAR: I'm not going to get anything from Bill because he's not an electrical guy.

Hum?

MEMBER SHACK: They're not going to change it, right?

CHAIRMAN STETKAR: Well, I mean, in principle, they could. There are other designs. You know, this is a software-driven protection system. So, I can sit my software programmers down to make logic rules that say, if A and B, then not C type things.

MEMBER BROWN: It is easy to trip the breaker when you trip the reactor and trip the TG.

CHAIRMAN STETKAR: Dennis?

MEMBER BROWN: Well, let's compromise. Shouldn't we at least know what the potential impact would be?

MEMBER BLEY: Yes.

MEMBER BROWN: I mean, what are the loads?

MEMBER BLEY: I would agree with that.

MEMBER BROWN: What's in there?

MEMBER BLEY: Okay. I certainly agree with that.

MEMBER BROWN: If, analytically, the design comes out of it, I don't care.

CHAIRMAN STETKAR: Let's at least keep it on the list and, from that perspective, to at least understand --

MEMBER BROWN: Well, I would think they ought to tell us why it is not a problem.

CHAIRMAN STETKAR: Make sure the design actually does that.

MEMBER BROWN: Yes, and it's not going to damage anything. We ought to get an explanation of that.

CHAIRMAN STETKAR: And whether or not you are setting yourself up to any vulnerabilities, either because of the loading itself or reliability considerations, just because you're cycling the breakers, presuming the pumps have instantaneous coast-down, for example, which they don't.

MEMBER BROWN: I'm not particularly worried about the breakers as much as I am the loads.

CHAIRMAN STETKAR: I'm just running down

the list here. So, a question about, are there fluids in the --

MEMBER BLEY: That's it, yes. That is a simple one. Let them answer that. Keep that on your list. It's either yes or no.

CHAIRMAN STETKAR: I'm glad you're becoming more animated now.

Diversity of the AAC gas turbine generators versus the Class 1E, should we --

MEMBER BLEY: No, I think not. I'm curious about it, but we have used diesels elsewhere and not said we need something other than diesels.

MEMBER BROWN: I agree.

MEMBER BLEY: But their claiming it is diverse just gets --

CHAIRMAN STETKAR: Well, what helped me a lot was saying that the AAC gas turbines at least will be an in-line single gas turbine, single generator, which says --

MEMBER BLEY: That helps me a little, but we have got the same failure mode. It probably won't happen near the same time because of those differences. So, I think that probably helps, but --

CHAIRMAN STETKAR: We'll cross that one off.

MEMBER BLEY: They are not what I consider diverse, but we haven't had that requirement before.

CHAIRMAN STETKAR: Then, I don't know. Should we keep it as an action item or just we know we're going to discuss it, the whole issue of gas turbine generator reliability? Let's just --

MEMBER BLEY: We've got a meeting coming up.

CHAIRMAN STETKAR: We've got a meeting coming up.

A question, something you brought up, Dennis, the schedule and the responsibilities between the --

MEMBER BLEY: I want to bring that up with the COL when they come.

CHAIRMAN STETKAR: -- design cert -- do you know where I'm going? ERGs and EOPs?

MEMBER BLEY: Yes, I want to talk --

CHAIRMAN STETKAR: Okay.

MEMBER BLEY: I think I understand what Mitsubishi is saying, but I want to make sure, when the COL is here, that we really understand how that is going to work.

CHAIRMAN STETKAR: The COL will be in, by the way, February 23rd.

MEMBER BLEY: Oh, so I won't be here probably.

CHAIRMAN STETKAR: So, we will just leave that. We will not put that separate on the list.

Charlie?

MEMBER BROWN: Back on the gas turbines again --

CHAIRMAN STETKAR: Yes?

MEMBER BROWN: -- I understand your all's comments relative to that diesels at post-seismic testing don't get proven for operational performance. That's not a requirement.

But there's also, I presume we have had plants in the zones of earthquakes where earthquakes have occurred and, subsequent to those earthquakes, diesels have performed.

MEMBER BLEY: That's true.

CHAIRMAN STETKAR: That's true.

MEMBER BROWN: And so, there is a history.

MEMBER BLEY: Here and around the world.

MEMBER BROWN: Yes, I understand. My point being that, thinking subjectively, there is a history that shows that they perform. Is there any history of gas turbines being subjected to seismic events and then performing? I am just nervous about throwing -- I understand, whatever the logic is, that you are saying it is not, quote, "required." I'm just nervous about a new, unused component with no experience in this application and having no background.

If somebody said, hey, they were used in chemical power plants for back-up power, the plants were subjected to seismic events, and the gas turbines operated satisfactorily afterwards --

MEMBER BLEY: We could ask our staff to chase that. I'm sure in California there's plenty of gas turbines.

MEMBER BROWN: Oh, I know there are, yes, and I'm not trying to ask the staff to do their work for them. But it seems to me Mitsubishi should be able to provide some type of assurance that, yes, there is a history of performance of gas turbines under seismic events in other plants that use them for back-up generators.

MEMBER BLEY: It's probably not a good reason to have a comfortable feeling, but if you can throw 100 percent load on a machine suddenly and not damage the bearings and tear up the bolts and other things, it's a hell of a physical shock on the machine.

MEMBER BROWN: I've tested steam turbine generators, that that's kind of the way we ran the stuff. It had to pick up all the load. And it is a stress, but when you look at it compared to the shock test we run, it is not even close.

CHAIRMAN STETKAR: I mean, you know, everybody has had the benefit of -- we're on the record here -- everybody has had the benefit of listening to this discussion. If there is anything that can be brought to the table in February, when we start talking about gas turbine reliability, either from Mitsubishi or the staff, that would provide more comfort, if not actual data about survivability of actual operating unit gas turbines during seismic events, that might help.

MEMBER BLEY: Or, since they have made a big reference to that these are a derivative of jet engines, and you ought to use jet engine thinking looking at these, there may be some real shock experience on jet engines as well. I don't know the answer to that. I've never thought about it until this instant.

MEMBER BROWN: They're hung differently. I mean the application and the hard mounting, it is just not the same. I mean wings flex. You're more worried about the fuel lines in most of those circumstances.

CHAIRMAN STETKAR: I have two other potential ones for the list. One is the physical space in the Control Room area to accommodate relocation of the plant management people. Is that worth following?

MEMBER SHACK: Yes, I think that just becomes a fairly simple answer, but --

CHAIRMAN STETKAR: I would hope so.

MEMBER BLEY: Yes. Yes, I think it is.

CHAIRMAN STETKAR: Okay.

MEMBER BLEY: I'm still thinking about the gas turbines a bit. From experience on diesel generators and shake table, an analysis of fragilities under seismic, it is essentially always the control systems that are the weak spot, primarily because of the way they are mounted, and they can move around. I wonder if that is consistent with the experience you guys saw?

MEMBER BROWN: Well, I can only tell you one circumstance where there was a turbine generator designed for a Navy vessel that was designed by a very competent manufacturer, very, very competent designer and manufacturer. And this was before the days where we had a large enough shock barge to test them on.

Post-ship delivery, 5-10 years later, I was in the unfortunate position of having to run a shock test on the qualification or prototype unit for that, which was essentially identical to the ones in the ship, and it was not powered, but it was rotated with air. We shocked it, tried to rotate it. It didn't turn.

And there, then, became a significant bearing redesign. I mean it was not turning even at rated RPM. So, fortunately, it didn't destroy itself, which it could have really done that.

So, there was a big redesign of the whole bearing system, and then it was backfitted into the ship.

MEMBER BLEY: I'll be done with this in a second.

Your testing, as I am gathering from the words, isn't like an earthquake shake testing. This is really a battle damage simulation?

MEMBER BROWN: Well, it's 60,000 pounds of HBX blown up 15 feet or 100 feet.

MEMBER BLEY: It is a shock test, which isn't the same kind of thing.

MEMBER BROWN: No, it's smaller when it's not -- you know, a ship shock test, they use big explosives. The ones in the gorges or the big pond of water are much less, but you still get a pretty big blow.

I'm just saying there are circumstances where they have not worked, and it was a very competently-designed machine. It looked pretty, quote, "It appeared to be robust."

MEMBER BLEY: The only other thing I would say is -- and Bill mentioned this earlier -- is, in the seismic area, the fragility analysis that is done has been much of that equipment is shake table tested. It doesn't go through the testing afterwards you describe.

But, also, we have had fairly good-sized earthquakes not too far from the fragility calculations that give us some confidence in operability of other equipment, but no gas turbines --

MEMBER BROWN: You do have the excitation though.

MEMBER BLEY: Yes.

MEMBER BROWN: But that's still an analysis, and you don't know whether --

MEMBER BLEY: No, the analysis has matched the real-world shaking when we have had an earthquake in a number of cases of the equipment for various kinds of equipment, but not gas turbines, as far as I know.

CHAIRMAN STETKAR: It is still worth -- I mean, if MHI has any evidence --

MEMBER SHACK: Well, I mean these things have to be qualified to work. The question is how they are going to be qualified. Now whether it is by analysis, by test, by experience, I'm not --

MEMBER BLEY: And is this qualification we have covering it?

MR. CIOCCO: Yes.

MEMBER BLEY: So, at the next meeting, we will deal with that.

MR. CIOCCO: The is answer is yes. There is a section on this, on the seismic analysis.

CHAIRMAN STETKAR: That's why I say I think, you know --

MEMBER BROWN: It says title, "Seismic Analysis," but the definition of --

CHAIRMAN STETKAR: All of the interested parties have been privy to this discussion. So that, I'm assuming they will come to the February meeting prepared to, hopefully, assuage your concerns as much as possible.

MEMBER BROWN: Well, I'm sorry to be a wrench in the gears here.

CHAIRMAN STETKAR: No, no, no.

MEMBER BROWN: It is just it is a brand-new piece. It's not been used.

CHAIRMAN STETKAR: We're happy to have you here.

MEMBER BLEY: If it were easy, there would be a different answer.

MEMBER RYAN: That's why blowing something up isn't exactly a representation of what this is --

MEMBER BROWN: Well, the shock tests have a frequency spectrum that they get applied to --

MEMBER SHACK: No, but his analogy is you designed by analysis when you did the test and it failed.

MEMBER BROWN: Okay, fine.

CHAIRMAN STETKAR: They theoretically designed it for that.

MEMBER BROWN: Yes, they thought they had the tools and it looked --

MEMBER BLEY: And some of the things that we have designed for seismic have failed on shake tables, too. And then, they have been redesigned.

MEMBER BROWN: I have had other things

fall apart on shock or vibration.

MEMBER RYAN: I got you. Okay.

CHAIRMAN STETKAR: I have one more thing here for the list, so that we can actually go home. That is something I asked. I don't know whether it is important enough. That is the question of the stated power supply for the Technical Support Center being 30 minutes when I read the discussion of the Technical Support Center --

MEMBER BLEY: I don't understand that.

CHAIRMAN STETKAR: And when I read the electrical stuff, it seems to say that non-safety power is rated for an hour. So, I don't know whether they have accounted for Technical Support Center loads, whether it is simply an editorial difference between two parts of the documentation or, if it is real, I mean if in order for the non-safety-related batteries to survive for one hour, they are actively shedding Technical Support Center loads, that is important information to know.

So, I would like to leave that. Hopefully, it is just an editorial issue between different sections of the reports.

MEMBER SHACK: No, if it's real, that may be the most significant item.

CHAIRMAN STETKAR: If it's real, it might be important.

(Laughter.)

And that's all I had for the potential list.

Yes, sir?

MR. COLEMAN: If I might add about I give an interim presentation on the GTG testing --

CHAIRMAN STETKAR: Oh, yes.

MR. COLEMAN: -- when the information is available, rather than wait for the Final SER.

CHAIRMAN STETKAR: Yes, and I think what we should do, Neil, is work with the staff. If it is at all possible, if, indeed, the information is available from the testing program in a form that is in a report that has been submitted to the staff, and the staff has had the opportunity to look at it within enough time to transmit that report to us for the February meeting, then we should try to handle that in February.

If, indeed, all of those things don't fall into line in that timeframe, then I do think we need to schedule a presentation on that data, on the reliability information at some later Subcommittee meeting, but certainly before we get to the Final SER, only in case the Subcommittee members, or if it's important enough, the full Committee, have strong differences of opinion about what additional information might be required to justify the reliability.

But that depends a little bit on what information, the timing of what information becomes available, either before that February Subcommittee meeting or for a future meeting.

Anything else?

MR. CIOCCO: No, I think that is a good idea. The reason that we didn't do it in May 2009 was because of the GTG report, of course, at the time, and we talked with Mitsubishi a little bit during the break, and we think the February meeting will work. We may not have a staff position on the results at that time, but we would have the results report by HMI. And we can work with you on a good annotated presentation outline --

CHAIRMAN STETKAR: Yes.

MR. CIOCCO: -- of the areas that you would like to see.

CHAIRMAN STETKAR: Yes, I think that makes sense.

I was just a bit concerned that I don't

want necessarily our meeting schedule to derive something that we receive that is incomplete or that you haven't had a chance to at least look through with some time for consideration.

Anything else?

(No response.)

Good. Well, I would like to thank --

MEMBER BROWN: May I bring up one educational question for myself relative, since I have a lesser background in terms of the required ability to supply support power? A half hour, when you all started talking about that, I saw that and for the one hour.

Is that because it is anticipated? What's the basis of that? We are going to abandon these spaces?

CHAIRMAN STETKAR: I don't know. I mean, theoretically, the Technical Support Center would remain fully habitable for the nominal one-hour period that it takes to repower things from the auxiliary gas turbine generator --

MEMBER BROWN: So, that's the point?

CHAIRMAN STETKAR: -- at which point I don't need to rely on the batteries.

MEMBER BROWN: Okay.

CHAIRMAN STETKAR: It is just that in Chapter 8 they talk about a nominal 60-minute life for those batteries, and in Chapter 13 they talk about power available for 30 minutes.

MEMBER BROWN: Yes, I got that.

CHAIRMAN STETKAR: So, that is where the split is.

MEMBER BROWN: Okay. All right. Thank you.

CHAIRMAN STETKAR: Anything else?

(No response.)

Well, with that, I would like to thank very much Mitsubishi. I think we had very good presentations, and I appreciate that. They're always very good.

Staff, thank you. As usual, a good job.

And we are closed, adjourned. Thank you.

(Whereupon, at 2:51 p.m., the proceedings in the above-entitled matter were adjourned.)

US-APWR

Design Certification Application

Tier 2: Chapter 8

November 29, 2010

Mitsubishi Heavy Industries, Ltd.

Presenters

Kawanago Shinji

Senior Vice President, Licensing and Engineering

Mitsubishi Nuclear Energy Systems, Inc.

Niida Shinji

Principal Engineer, Electrical Engineering Section

Mitsubishi Heavy Industries, LTD.

Richard Barnes, PE

Principal Engineer, New Plant Engineering

Mitsubishi Nuclear Energy Systems, Inc.

Contents

1. Overview of Chapter

- Title of Chapter

  Chapter 8: Electrical Power

- Scope of Chapter

  According to RG 1.206 and SRP, Chapter 8 consists of following subsections:

  8.1 Introduction

  8.2 Offsite Power System

  8.3 Onsite Power Systems

  8.3.1 AC Power Systems

  8.3.2 DC Power Systems

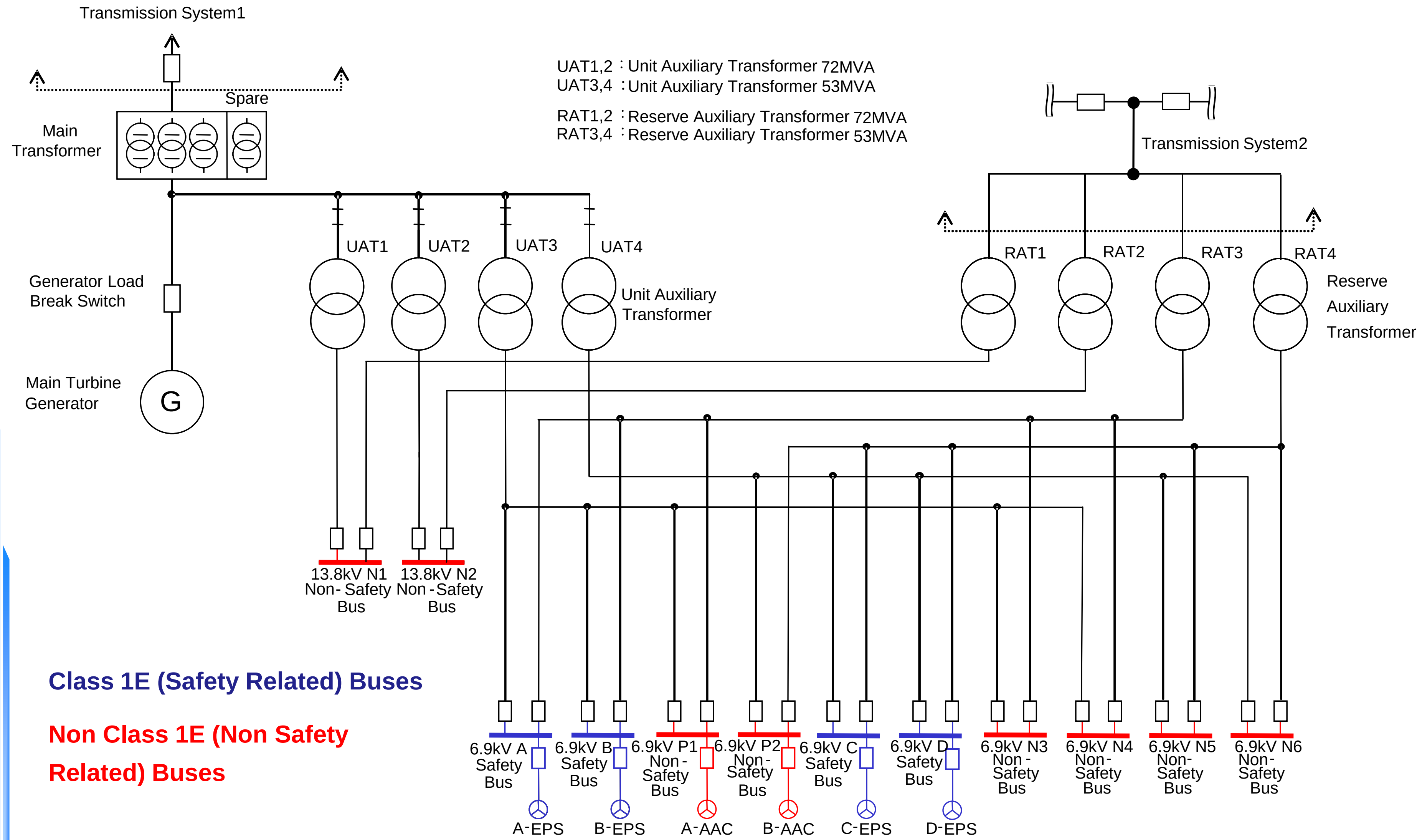
  8.4 Station Blackout

2. Features of Electric Power System

Offsite Power System (8.2)

- **Design Features**
  - ✓ The two (2) sources of offsite power provide:
    1.) Unit Auxiliary Transformers (UAT) thru Main Transformer
    2.) Directly to the Reserve Auxiliary Transformers (RAT)
  - ✓ The two (2) offsite power supply circuits are independent and physically separated.
  - ✓ Either offsite power supply circuit has the capacity for normal operations and Design Basis Events (DBE) to comply with the applicable GDC's.
- **Major RAIs (discussed later in detail)**
  - ✓ Supply power to the onsite Class 1E power system

2. Features of Electric Power System



Class 1E (Safety Related) Buses

Non Class 1E (Non Safety Related) Buses

Figure-1 Main One-Line Overview

2. Features of Electric Power System

Onsite Power System (8.3)

➢ Design Features

- ✓4 train Class 1E AC electrical power system trains.
- ✓Each train includes a separate Class 1E GTG as its emergency power source.
- ✓On-Line Maintenance with Single-Failure Criterion remaining satisfied.
- ✓“Permanent” buses supplied from Alternate AC Power Source (AAC-GTG).
- ✓Non-safety related loads are electrically separated from Class 1E buses.
- ✓Required non-safety related loads are supplied from AAC during LOOP.
- ✓AACs provide power to all SBO required loads to bring and maintain the unit in safe-shutdown.

2. Features of Electric Power System

Class 1E Gas Turbine Generator Specifications/Ratings

- **Gas Turbine Ratings**
  - ✓ Continuous Rating: 4500 kW
  - ✓ Short time Rating : 4950 kW
- **Generator Ratings**
  - ✓ Continuous Rating: 4500 kW / 5625 kVA
  - ✓ Power Factor of 0.8
  - ✓ 6900 Volt; 3 Phase, 60 hertz
- **Start time**
  - ✓ < 100 Seconds start time
- **Load**
  - ✓ Limiting Case; LOCA

2. Features of Electric Power System

Class 1E GTG Testing Program

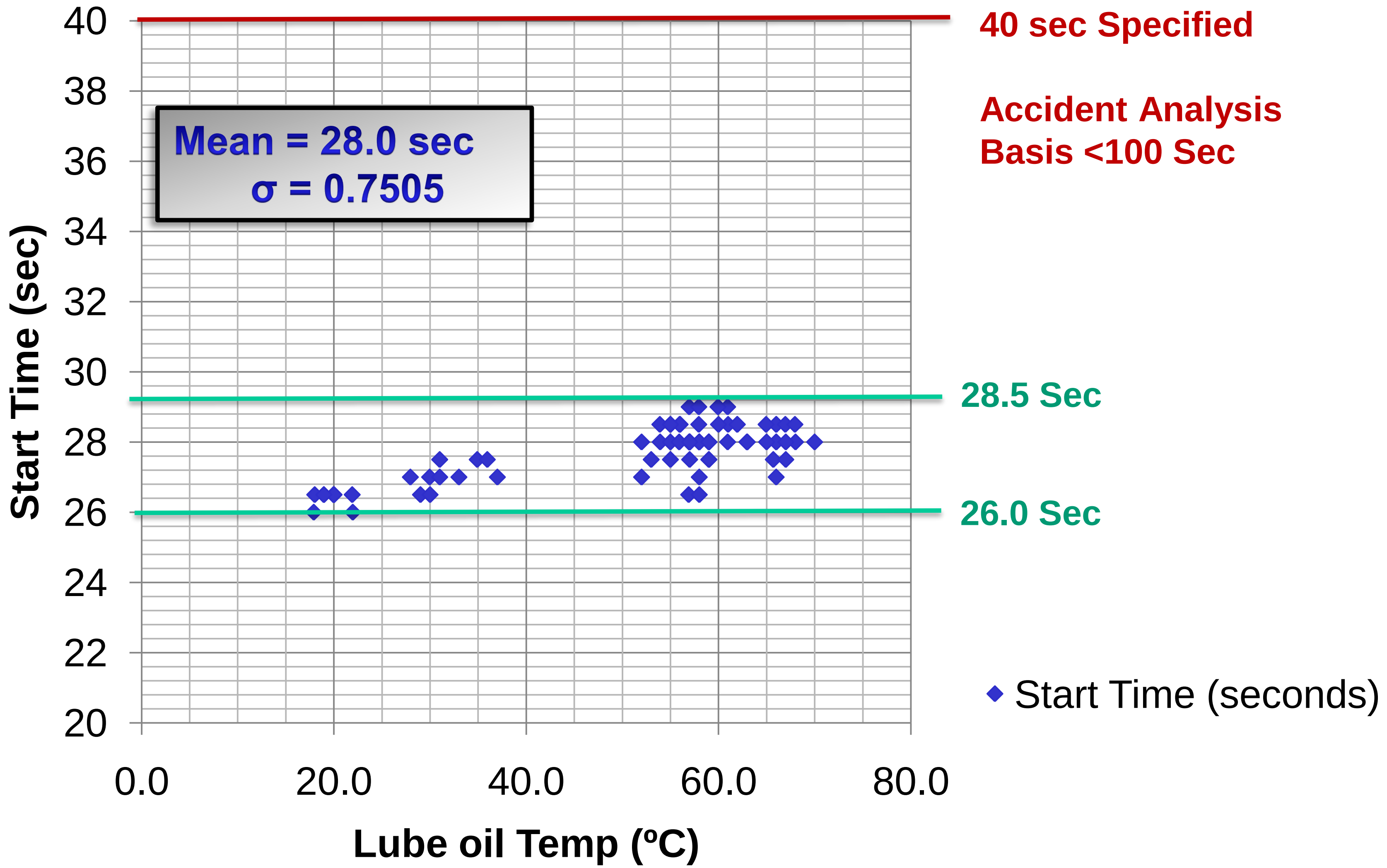
- **Regulatory guide 1.9**
  - ✓ Application and Testing of Safety-related Diesel Generators in Nuclear Power Plants
- **IEEE 387**
  - ✓ IEE Standard Criteria for diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations.
- **ISG-21 (Draft)**
  - ✓ Interim Staff Guidance On the Review of Nuclear Power Plant Designs using a Gas Turbine Driven Standby Emergency Alternating Current Power System
- **MHI Technical Report**
  (Qualification Test Plan Rev 2)
  - ✓ Qualification and Test Plan for Class 1E Gas Turbine Generator System

Class 1E GTG Initial Type Tests

- **Load Capability Test**
  - ✓ IEEE 387 6.2.1
  - ✓ To demonstrate the capability to carry rated load
- **Start and Load Acceptance Test**
  - ✓ IEEE 387 6.2.2
  - ✓ To establish the capability to start and accept load within the required time period.
  - ✓ 150 Start Tests will be conducted
- **Margin Test**
  - ✓ IEEE 387 6.2.3
  - ✓ To demonstrate the capability to carry the most severe load step + 10%

2. Features of Electric Power System

Class 1e GTG Preliminary Test Results



2. Features of Electric Power System

Class 1e GTG Preliminary Test Results

Transit Response Test	50% Load Addition	50 % Load Rejection	100% Load Addition	100% Load Rejection
Voltage Deviation	-450 Volts -6.5%	+414 Volts +6.0%	-828 Volts -12.0%	+882 Volts +12.8%
Voltage Recovery	1.0 Second	1.0 Second	1.0 Second	1.0 Second
Frequency Deviation	-1.1 Hz -1.8%	+1.1 Hz +1.8%	-2.2Hertz -3.7%	+2.2Hz +3.7%
Frequency Recovery	2.0 Seconds	2.0 Seconds	2.5 Seconds	3.0 Seconds

Rated 6900 Volts; 60 Hertz

2. Features of Electric Power System

- **Major RAIs for Section 8.3 (discussed later in detail)**
  - ✓ Redundancy of Onsite Power System
  - ✓ Reliability of Gas Turbine Generator

2. Features of Electric Power System

Station Blackout (8.4)

➢ Basic Concept for Coping with SBO

- ✓ The AACs are available in the event of SBO, when all offsite power sources and EPS's are not available to bring the unit to a safe shutdown condition and maintain that status

➢ Design Basis

- ✓ Diverse AACs to minimize the potential for common mode failures between EPS system
- ✓ The non-class 1E AAC is a packaged gas turbine-generator connected to a 6.9kV AC "Permanent" bus
- ✓ AAC can be aligned to any of the 4 class 1E bus in response to an SBO
- ✓ AAC supplies safe shutdown loads during the SBO coping period (8 hours)

2. Features of Electric Power System

- **Major RAIs for Section 8.4 (discussed later in detail)**
  - ✓ Operation for coping with Station Blackout
  - ✓ Capability of Alternate AC Power Source against Station Blackout

3.*Major RAIs*

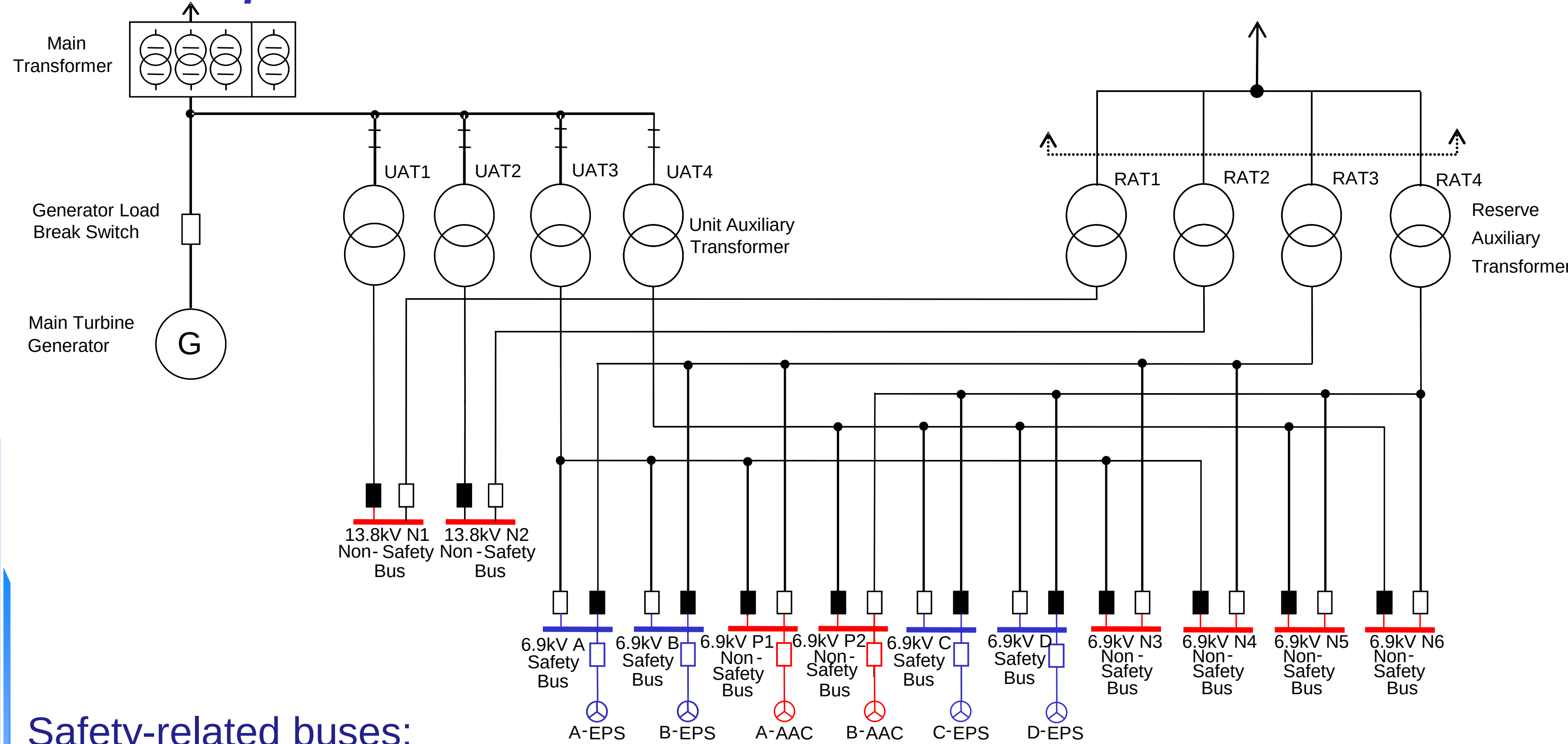
NRC RAI

- 1) Supply Power To The Onsite Class 1E Power System
  - SECY-91-078* requirement;
    - ✓ An evolutionary plant design should include at least one offsite circuit to each redundant safety division supplied directly from one of the offsite power sources with no intervening non-safety buses in such a manner that the offsite source can power the safety buses upon a failure of any non-safety bus.

*:"EPRI's Requirements Document and Additional Evolutionary LWR Certification Issues ,"

3.Major RAIs (Cont'd)

MHI Response



Safety-related buses:
Normally fed from RATs.

Non-Safety-related buses:
Normally fed from UATs.

If power from UATs is lost and a non safety-related MV bus fails concurrently; safety related MV buses are not affected and continue to receiving stable power from RATs.

3. *Major RAIs (Cont'd)*

NRC RAI

- 2) Redundancy of Onsite Power System
  - Any 2 of the 4 trains is adequate to meet electrical load requirements during LOOP, and LOOP & LOCA occurring simultaneously.
  - Any two out of four trains can achieve the Emergency Power System's safety function with one train out of service and with a single failure on another train.

3.Major RAIs (Cont'd)

MHI Response

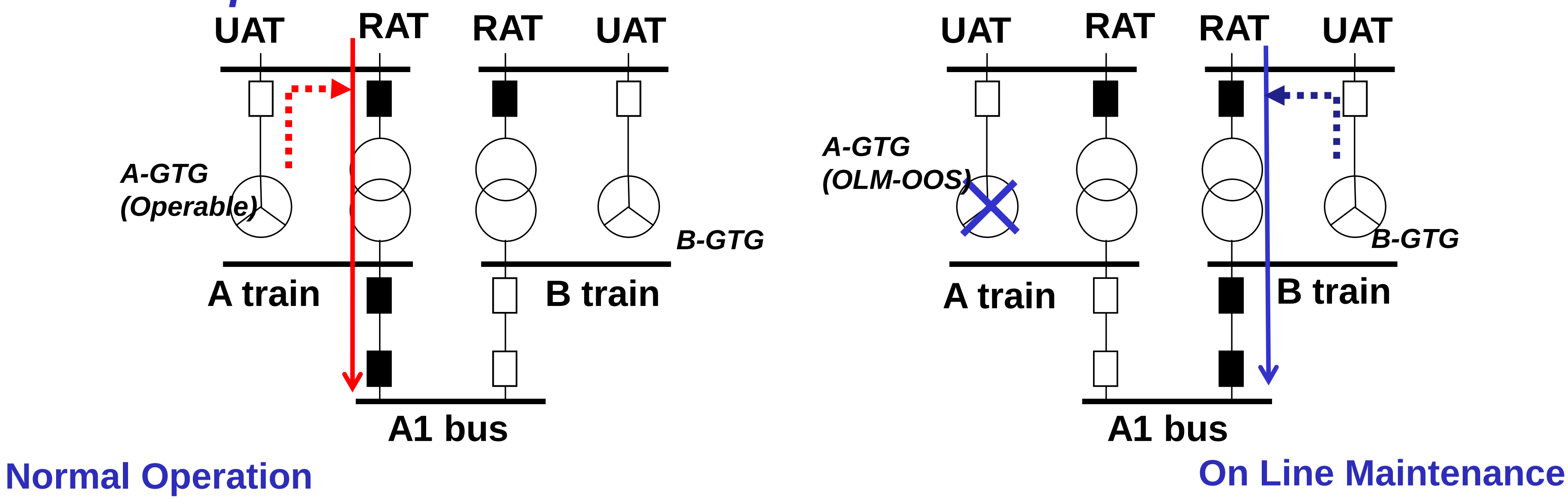


Figure: Power supply to A1 bus

- Based on the arrangement of the 480 Volt A1 and D1 loads, the US-APWR design does not rely on manual actions to achieve a safe shutdown of the plant using any two out of four trains.
- Manual switching of A1 or D1 480V load center is required and accomplished prior to taking the A or D train GTG out of service for maintenance. These manual actions, once taken allow full automatic operation of the Emergency Power system.

3.*Major RAIs* *(Cont'd)*

NRC RAI

- **3) GTG Reliability**
  - ✓ The staff Requested detailed GTG reliability data and calculations as applied to US-APWR.
  - ✓ The staff required the test condition of starts and load acceptance tests in IEEE-387.

3.Major RAIs (Cont'd)

MHI Response

- US-APWR GTG has a higher reliability based on, manufactures operating experience as compared with US nuclear safety related EDG's using the same probabilistic approach.

- US-APWR GTG initial type test
  - ✓ The reliability of Class 1E Emergency Power Source must over 0.95 with 95% confidence based on R.G 1.155.
  - ✓ Test data from the start and load acceptance test (initial type test per IEEE 387) will be used to verify the reliability.
  - ✓ US-APWR has selected150 Starts without a failure is an adequate sample size to statistically determine the reliability with a greater then 95% confidence level

3.*Major RAIs* *(Cont'd)*

NRC RAI

- **4) Operation for coping with Station Blackout**
  - ✓ Since the power from the AAC GTG to Class 1E buses is not restored until 60 minutes into an SBO;
  - ✓ How to maintain following function?
    - RCP seal
    - Capability to remove decay heat
    - The compressed air capacity
    - Battery capacity
    - Effects of the loss of ventilation

3. Major RAIs (Cont'd)

MHI Response

- ✓ Because the plant is kept at hot shut down conditions during the early stages of a SBO; RCS shrinkage will not occur.
- ✓ The emergency feedwater pit supplies water to remove decay heat during SBO. The pit has sufficient capacity for greater than 8 hours.
- ✓ The US-APWR utilizes only the motor operated valves for safety-related valves powered from the Class 1E Batteries.
- ✓ The Class 1E batteries are designed to supply these loads for a period of two hours without charging.
- ✓ Equipment located turbine driven EFWP Area, Corridor, Main Steam/Feedwater Piping Area and Battery Rooms are designed to remain operable without ventilation for a period of one hour for a SBO

3. *Major RAIs (Cont'd)*

➢ 5) Capability of Alternate AC Power Source

MHI Response

- ✓ The 2 AAC-GTGs power the P1 and P2 buses during LOOP conditions.
- ✓ During an SBO event one of the two AAC GTGs will be used to power SBO Loads.
- ✓ Regulatory position requires maintaining the plant in a safe shutdown condition during SBO. Safe shutdown condition during SBO for US-APWR is hot standby.
- ✓ The US-APWR can achieve hot standby conditions by using only one AAC-GTG and one train Class 1E system.
- ✓ US-APWR can achieve cold shutdown condition by using the other AAC-GTG and additional Class 1E train.

4. Summary

- ✓ US-APWR is designed with two independent off-site power sources. Each having sufficient capability to operate the plant safety under normal conditions or in response to any DBE.
- ✓ Class 1E onsite power system consists of four 50% trains. Any 2 trains maintain the safety function
- ✓ Class 1E onsite power system can maintain its safety function with any one train in OLM and tolerate a single failure.
- ✓ Independency and separation within Class 1E onsite power system complies with Reguides, IEEE and related guide lines.
- ✓ Class 1E GTG complies with R.G 1.9, IEEE 387 and ISG 21 (draft).
- ✓ Class 1E qualification including initial type test is ongoing.
- ✓ US-APWR diverse AACs to minimize common mode failure and respond to a SBO

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Presentation to the ACRS Subcommittee

Chapter 8 - Electric Power Systems

US-APWR Design Certification Application Review

Technical Reviewers - Robert Fitzpatrick and Tania Martínez Navedo

Project Manager – Ngola Otto

November 29, 2010

Presentation Outline

- Overview of the DC Application
- Offsite Power System
- Onsite ac Power System
- Onsite dc Power System
- Station Blackout
- Open Items
- Conclusions
- Discussion / Committee questions

Staff Review Team

- Technical Staff
  - Robert Fitzpatrick, Electrical Engineering Branch
  - Tania Martínez Navedo, Electrical Engineering Branch
- Project Managers
  - Ngola Otto, Chapter 8 PM
  - Jeff Ciocco, Lead PM

Overview of the DC Application

SRP Section/Application Section	No. of Questions	No. of OI
8.1 Introduction	0	0
8.2 Offsite Power System	16	0
8.3.1 Alternating Current (AC) Power Systems (Onsite)	38	2
8.3.2 Direct Current (DC) Power Systems (Onsite)	22	1
8.4 Station Blackout	14	2
Total	90	5

Offsite Power System

- Minimum two transmission lines from the offsite power system – meets GDC 17 & 18
- Switchyard configuration – Site specific
- SECY 91-078 – direct connection between the offsite power source and the Class 1E safety buses

Onsite ac Power System

- Class 1E Distribution System – Four trains (A, B, C, D)
  - Physical separated and electrically isolated trains
- Onsite power sources – four emergency Gas Turbine Generators (GTGs)
- Capacity of each Class 1E GTG - 4500 KW or greater
- 4 - 50% capacity
- BTP 8-6 (Degraded grid protection system)
- GTGs are housed in separate rooms in the Power Systems Building

Onsite dc Power Systems

- 4 Class 1E battery trains - 60 cells
  - Supply power to safety systems dc loads, the Class 1E I&C power supply, and emergency lighting systems for the vital areas
- 125 Vdc Class 1E dc systems - 4 trains (A, B, C, D)
  - Each system consists of a main distribution switchboard fed from a battery and a battery charger.
  - Physical separated and electrically isolated trains
- 4 Non-Class 1E battery trains - 60 cells
  - Provides reliable continuous dc power to the plant non safety system dc loads, and to the non-Class 1E I&C power supply system.
- Each battery train is housed in a separate room in the Power Systems Building

Station Blackout

- Alternate AC (AAC) sources
  - 2 GTGs: A-AAC and B-AAC
    - A-AAC is connected to the non-Class 1E 6.9 kV permanent bus P1
    - A-AAC is connected to the non-Class 1E 6.9 kV permanent bus P2
  - Rating: 4000 kW

- AAC GTG Design Features
    - Diverse manufacturers, starting systems and engine sizes
    - Located in separate areas
    - Independent auxiliaries

Station Blackout

Confirmatory Items of Interest

- Confirmatory Item 08.04-1: During the August 6, 2009 US-APWR Public Meeting, the applicant stated a plan to use different manufacturers for the Class 1E GTGs and non-safety AAC GTGs. This will minimize common cause failures by using different manufacturers, designs and components.

- Confirmatory Item 08.04-2: In a letter dated August 21, 2009, the applicant committed to add a description of the manner in which both AAC-GTGs would be used to go to cold shutdown if required.

Open Items

- Chapter 8, Electric Power Systems Safety Evaluation (SE) has 5 Open Items
- List of Open Items (OI):
  - Open Item 08.03.01-1 - Maintenance and Testing of Inaccessible Cables
  - Open Item 08.03.01-2 – GTG Reliability
  - Open Item 08.03.02-1 – Battery Sizing Calculations
  - Open Item 08.04-1 – RCP Seal Leakage Rate During SBO
  - Open Item 08.04-2 – AAC GTG Periodic Testing

Open Items

- Open Item 08.03.01-1: Maintenance and Testing of Inaccessible Cables
  - Generic Letter 2007-01 guidance on preventing the degradation of medium voltage cables that are installed in underground duct banks.
  - Applicant's proposed resolution consisting of describing a method to mitigate water intrusion into the underground conduits:
    - Duct banks sloped for water drainage into the manholes
    - Temporary sump pumps will be available for removing the water from the manholes.
    - Periodical testing of underground cables, such as partial discharge testing, time domain reflectometry, dissipation factor testing, and very low frequency AC testing.
  - The applicant has not provided a COL Information Item for this.

- Expected Resolution
  - The applicant needs to include a COL information item identifying the responsibility of the COL applicant to maintain a program to monitor and mitigate the degradation of inaccessible cables in accordance with the guidance of GL 2007- 01 after the plant is licensed.

Open Items

- Open Item 08.03.01-2 – GTG Reliability
  - The applicant chose a 95% reliability target with 95% confidence level as the minimum requirement for reliability of emergency power source.
  - First-of-a-kind application of GTG to Class 1E sources in nuclear plants, therefore there is no operating experience available.
  - Technical Report MUAP-07024-P, Rev. 2, provides technical information about the GTG and their qualification plan, but does not provide type test data that supports the 95% reliability and 95% confidence level targets chosen by the applicant.

- Expected Resolution
  - Currently, the applicant is performing qualification testing on a prototype of the Class 1E GTG intended to be used in the US-APWR design. Test results will allow the staff to determine the suitability and acceptability of the proposed GTGs for use as NPP emergency onsite power sources.

Open Items

- Open Item 08.03.02-1 – Battery Sizing Calculations
  - The applicant reports in its DCD a load current requirement of 1 Ampere for the Class 1E 480V Load Center. Compared to operating experience data for Class 1E 480V load centers, a load current requirement of one Ampere appears to be too low in terms of battery loading.
  - The applicant indicated that its assumptions for the types of loads were made based on Japanese experience and products. The applicant agreed to provide a more in-depth explanation of this issue which will be incorporated in the upcoming DCD revisions.

- Expected Resolution
  - The applicant has committed to provide more detailed information regarding load current requirements for all of the loads included in the battery sizing calculations in a future revision to the DCD.

Open Items

- Open Item 08.04-1 – RCP Seal Leakage Rate
  - The applicant has stated that:
    - The leakage of reactor coolant through the seals of each RCP is assumed to be 0.2 gpm. Therefore, the total loss of coolant inventory within 1 hour from the seals on all four RCPs is expected to be 48 gallons.
  - Because of the uncertainty of RCP seal leakage during SBO, industry guidance was developed in NUMARC-8700 for use in coping analyses. The assumed seal leakage per RCP in all PWRs was established as 25-gpm.
    - The use of 0.2-gpm-per-pump leakage deviates by over 2 orders of magnitude from this industry position. The applicant needs to justify the deviation from industry standards for its RCP design by actual test results or demonstrate that the design can cope with the higher leakage rate.

- Expected Resolution
  - The applicant is expected to provided NRC staff with its planned approach for resolution of this issue and then to follow through accordingly.

Open Items

- Open Item 08.04-2 – AAC Power System Periodic Testing
  - The applicant's DCD states that the AAC power system will be inspected and tested periodically to demonstrate operability and reliability.
  - The inspection and testing will be conducted by the COL applicant over the lifetime of the NPP, therefore, the DCD should include these inspection and testing requirements as a COL Information Item.

- Expected Resolution
  - The NRC staff requested that the applicant add a COL Information Item in a future revision of the DCD to ensure that the AAC power system will be inspected and tested periodically to demonstrate operability and reliability in accordance with RG 1.155.

Conclusions

- The applicant has provided sufficient information to support the offsite power system with regard to the interrelationship among the nuclear unit, utility switchyard, and the interconnecting grid.

- With the exception of the 3 open items identified by the NRC staff, the applicant has provided adequate information on the onsite power system with regard to the availability of sufficient power to mitigate design-basis events given a loss of the offsite power system and a single failure in the onsite power system.

- With the exception of the 2 open items identified by the NRC staff, the applicant has provided necessary analyses to determine the capability of the design to withstand and recover from an SBO of an 8 hour duration.

ACRS Subcommittee Presentation
SE/OI Chapter 8

Discussion/Committee Questions

ACRS Presentation

US-APWR

Design Certification Application

Tier 2: Chapter 13

November 29, 2010

Mitsubishi Heavy Industries, Ltd.

Presenter

Kenji Mashio

Manager, New Plant Engineering

Mitsubishi Nuclear Energy Systems, Inc.

Ron Reynolds

Principal Engineer, New Plant Engineering

Mitsubishi Nuclear Energy Systems, Inc.

Russ Bywater

Manager, Licensing

Mitsubishi Nuclear Energy Systems, Inc.

Contents

1. Overview of Chapter

1.1 Title of Chapter

Chapter 13: Conduct of Operations

1.2 Scope of Chapter

This chapter provides information relating to the preparation and plans for the US-APWR plant design, construction, and operation

2. Topics of Section

- 13.1 Organizational Structure of Applicant
  - ✓ This section describes the COL Applicant's responsibilities for the following:
    - Management and Technical Support Organization
      - Design, Construction, and Operating Responsibilities
      - Organizational Arrangement
      - Qualifications
    - Operating Organization
    - Qualification of Nuclear Plant Personnel

2. Topics of Section

- 13.2 Training
  - ✓ This section describes the COL Applicant's development of training programs
  - ✓ Training program basic structure and content based upon NEI 06-13A, "Template for an Industry Training Program Description" Rev. 1 (RAI 60-1101)
    - Licensed Operator initial and continuing training
    - Non-licensed plant staff training

2. Topics of Section

➢ 13.3 Emergency Planning

✓ This section provides design features to support Emergency Planning, including:

- Technical Support Center (TSC)
  (RAI 46-215 and RAI 108-1515)
  - Adequate working space [NUREG-0696]

2. Topics of Section

- **13.4 Operational Program Implementation**
  - ✓ This section describes the COL Applicant's development of the Operational Program implementation
    - Schedule including milestones
    - Commitments
    - SRM-SECY-05-0197

2. Topics of Section

➢ 13.5 Plant Procedures

✓ This section describes the COL Applicant's responsibilities for developing the following:

- Administrative Procedures
- Operating and Maintenance Procedures (RAI 61-1102)
  - Operating and Emergency Operating Procedures
  - Maintenance and Other Operating Procedures

2. Topics of Section

- **13.6 Security**
  - ✓ This section describes the COL Applicant's responsibilities for developing a Physical Security Program
  - ✓ Physical Security features are described which meet the performance requirements of 10CFR73.55(b)

2. Topics of Section

- **13.7 Fitness-for-Duty**
  - ✓ The development of the Fitness-for-Duty program is the responsibility of the COL Applicant

3. RAI Summary

- **13.2 Training**
  - **60-1101, Revision 0, 8/27/2008**
    Training Program Requirement
- **13.3 Emergency Planning**
  - **46-215 Revision 0, 7/31/2008**
    Technical Support Center (TSC) Floor Space, TSC Power Source, and Decontamination Facility
  - **108-1515, Revision 1, 12/01/2008**
    Capability and Impact of Main Control Room (MCR) to accommodate TSC's plant management function

3. RAI Summary

- **13.5 Operating And Emergency Operating Procedures**
  - **61-1102, Revision 0, 8/27/2008**
    Added procedures development assurance consistent with NUREG-0800

- **13.6 Security**
  - **282-1984, Revision 1, 3/18/2009**
  - **283-2200 (Safeguards Related Information), 3/19/2009**
  - **613-4912, Revision 1, 8/6/2010**
    Physical security

4. Summary

- Chapter 13 provides information relating to the preparation and plans for the design, construction, and operation of the US-APWR plant.
- The purpose of Chapter 13 is to provide adequate assurance that the COL Applicant establishes and maintains a staff of adequate size and technical competence and that operating plans will ensure public health and safety is maintained.
- RAI Responses have been submitted by 10/20/2010.

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Protecting People and the Environment

Presentation to the ACRS Subcommittee

Mitsubishi Heavy Industries (MHI)

US-APWR Design Certification Application Review

Safety Evaluation with Open items

Chapter 13: Conduct of Operations

November 29, 2010

Staff Review Team

- **Technical Staff**
  - **Richard Pelton**, Training and Assessment Specialist
    Operator Licensing and Human Performance Branch
  - **James Kellum**, Senior Reactor Operations Engineer
    Operator Licensing and Human Performance Branch
  - **Mark Lintz**, Reactor Operations Engineer
    Operator Licensing and Human Performance Branch
  - **Edward Robinson**, Emergency Preparedness Specialist
    Emergency Preparedness, New Reactor Licensing Branch
  - **Peter Lee**, Senior Program Manager
    Reactor Security Rulemaking and Licensing Branch
  - **Wayne Chalk**, Security Specialist
    Integrated Security Coordination and Policy Branch

Staff Review Team

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

- **Project Managers**
  - Jeff Ciocco, Senior Project Manager
  - Mike Takacs, Project Manager

Overview of Design Certification Application, Chapter 13

SRP Section/Application Section		No. of Questions	Status Number of OI
13.1	Organizational Structure of Applicant	0	0
13.2	Training	1	0
13.3	Emergency Planning	4	0
13.4	Operational Program Implementation	0	0
13.5	Plant Procedures	1	0
13.6	Security	129	8
13.7	Fitness for Duty	0	0
Totals		135	8

Technical Topics

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Sections 13.1 - Organizational Structure of Applicant
13.2 - Training
13.4 - Operational Program Implementation
13.5 - Plant Procedures
13.7 - Fitness for Duty

- No open items.
- All sections contain COL information items to be addressed by COL applicant.
- The staff agrees that the COL information items are the COL applicant's responsibility and are appropriate to meet the criteria of NUREG-0800, Standard Review Plan

Technical Topics

Section 13.3. Emergency Planning

- No Open Items
- No Confirmatory Actions
- DCD satisfies TSC size and location
- SRP Interface Areas
  - Protection of MCR personnel during an emergency will be addressed in SE Section 6.4
  - TSC data retrieval capabilities will be addressed in SE Section 7.5
  - Post Accident Sampling System will be addressed in SE Section 9.3.2
  - TSC HVAC will be addressed in SE Section 9.4.1
  - TSC Voice and Data Communications Equipment will be addressed in SE Section 9.5.2
  - Onsite Decontamination Facilities will be addressed in SE Section 12.3
  - TSC dose analysis will be addressed in SE Section 15.0.3

Technical Topics

- 7 COL Information Items
  - Develop interfaces of design features with site-specific designs and site parameters.
  - Develop a comprehensive emergency plan as a physically separate document.
  - Develop an emergency classification and action level scheme.
  - Develop the security related aspects of emergency planning.
  - Develop a multi-unit site interface plan depending on the location of the new reactor on, or near, an operating reactor site with an existing emergency plan.
  - Develop emergency planning ITAAC.
  - Develop the description of the operation support center.

Conclusion

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- Except for the Open Items listed above, the staff concludes that Chapter 13 of the US-APWR DCD is acceptable in accordance with applicable regulations

Questions?