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OFFICIAL TRANSCRIPT OF PROCEEDINGS

TR04 (ACRS)
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B.J.WHITE, ACRS
P-315

THANKS! BARBARA JO
#27288

Agency: Nuclear Regulatory Commission
Advisory Committee on Reactor Safeguards

Title: Subcommittee Meeting on Advanced Boiling Water Reactors

Docket No.

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DATE: Tuesday, January 25, 1994 **PAGES:** 1 - 242

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UNITED STATES NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

DATE: January 25, 1994

The contents of this transcript of the proceedings of the United States Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards, (date) January 25, 1994, as Reported herein, are a record of the discussions recorded at the meeting held on the above date.

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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Subcommittee Meeting on Advanced Boiling Water Reactors

Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland
Tuesday, January 25, 1994

The meeting convened at 8:30 a.m., Caryle Michelson, Chairman of the Subcommittee, presiding.

PRESENT FOR THE SUBCOMMITTEE:

Carlyle Michelson
Thomas Kress
Peter Davis
Robert Seale
William Shack
Charles Wylie

ALSO PRESENT:

Robert Costner, ACRS Consultant
Medhat El-Zeftawy, Cognizant ACRS Staff Member

PROCEEDINGS

[8:30 a.m.]

MR. MICHELSON: The meeting will now come to order. This is a meeting of the ACRS Subcommittee on Advanced Boiling Water Reactors.

I am Carl Michelson, Chairman of the Subcommittee.

The ACRS Members in attendance are Peter Davis, Tom Kress, William Lindblad -- I think Bill will be here tomorrow but not today -- Bob Seale, William Shack, and Charles Wylie. The ACRS Consultant in attendance is Bob Costner.

The purpose of this meeting is to -- really, it's to finish our review of the FSER, and the remaining chapters that we have are Chapters 1, 9, Section 13.6, Section 14.2, Chapter 16, and Chapter 20 of the FSER for the advanced boiling water reactor design.

In addition, the Subcommittee will hear a briefing by GE representatives regarding previous issues and Subcommittee concerns. I believe that briefing will take place tomorrow.

Dr. Medhat El-Zeftawy is the Cognizant ACRS Staff Member for this meeting.

Rules for participation in today's meeting have been announced as a part of the notice of this meeting previously published in the Federal Register on January 13, 1994.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register notice. It is requested that each speaker first identify himself or herself and speak with sufficient clarity and volume so that he or she can be readily heard.

We have received no written comments or requests for time to make oral statements from members of the public.

Before we start, a couple of administrative matters: We will finish promptly at four o'clock tomorrow, so you can count on that, because I'm counting on it, and the plan today is to finish up these chapters. If they go faster than anticipated, then we might even be finished earlier today and can do some of tomorrow's agenda, even, if we move along that quickly. I am anxious now just to get this all tidied up.

I believe the staff wants to change slightly the order of presentation today. So, I'll leave up to their discretion, as long as we cover all the agenda items.

MR. WILSON: Good morning. My name is Jerry Wilson. I'm in NRR. We had planned to start with Chapter 9 this morning, but our folks are just arriving, so I thought I'd go through Chapter 1. It should go relatively quickly, and that will give everyone a chance to warm up.

As you know, we're finishing up our presentation on the ABWR SER. What I plan to talk about this morning is two things. One is Chapter 1 of the SER, and then I'm going to do a little discussion about where we go from here.

Now, speaking of Chapter 1, as you know this is primarily a summary chapter. It summarizes the staff's review. In this particular case, this version of the SER covers up to Amendment 32 of GE's Safety Analysis Report, and what I've done is, in the top part here, I've identified some sections of Chapter 1 that are a little bit different than what you normally see.

In particular, Section 1.5, where the staff summarizes how we do our review, I have pointed out in 1.5 the locations in the SER where we address all of the requirements of Part 52, in particular Section 52.47, which sets out the information that needs to be provided for design certification, and so, in there, I have described where you go to find the staff's evaluations for those requirements.

Also, Section 1.8 is different than what you would normally find. As we discussed in other matters about the design certification rule, we're trying to establish a clear framework of those requirements that we use to approve this design and that will become part of the rule, and so, here we have identified those requirements where we believe exemptions are warranted and also additional requirements that we used as part of our review of this design.

Now, this index takes you to sections of the SER that describe these requirements. You'll find this information not quite finished up yet. As we identified in our letter, we're still doing our review with the Office of General Counsel, and that's going on in parallel with the ACRS review, and we will plan to have the exemptions and applicable regulations tuned up in time for the Final SER.

Combined license action items -- we have discussed this before with the Committee. What we did in the Draft Final SER is identified a number of places where we felt the requirements to be -- that the COL applicant would have to perform. That index was identified in the draft. GE has formed a section in their SSAR, Section 1.9, where they have identified all of those, so that has pretty much resolved this issue. A few more came up in the later stages of our review, as we were finishing up our management review of this SER, and so, that's why this item still has an open item in it, but we're nearing completion of this.

Finally, we have another item that we've talked about before, the so-called Tier 2* items, issues where the staff has identified in advance that these involve unreviewed safety questions. So, if changes are proposed by an applicant referencing this design, they would have to seek prior review and approval before those changes could be made.

MR. MICHELSON: Is Tier 2* defined somewhere?

MR. WILSON: No, it's jargon. The proper terminology is Pre-Identified Unreviewed Safety Question.

MR. MICHELSON: Well, I think I understand what Tier 2* means, but would other readers later in life understand what it means?

MR. WILSON: In the proposed rule that was recently published in the Federal Register, on November 3rd, we described the change process for Tier 2 information, and in there, we point out that we're going to list certain areas that would, in our judgement, constitute unreviewed safety questions, and so, the changes in those areas would have to seek prior review and approval.

MR. MICHELSON: Where will that list appear?

MR. WILSON: In the rule itself, in the design certification.

MR. MICHELSON: It will not appear anywhere in the SSAR.

MR. WILSON: That's correct.

MR. MICHELSON: The items will be in the SSAR, but it won't be starred.

MR. WILSON: Right.

MR. MICHELSON: It will only be starred in the rule.

MR. WILSON: Right.

MR. MICHELSON: So, we don't know at this stage -- as far as the Committee is concerned, we don't know which ones you intend to star.

MR. WILSON: Yes. If you look at this index here, it will tell you the sections of the SER where these areas are.

MR. MICHELSON: Which index?

MR. WILSON: Section 1.11 of the SER.

MR. POSLUSNY: It's on page 1-13.

MR. MICHELSON: Okay. That's what that means.

MR. WILSON: Yes. So, if you go to those sections of the SER, you'll see the staff has said that changes in these areas constitute an unreviewed safety question, and you'd have to seek prior review and approval.

MR. MICHELSON: Does that mean that any changes in those sections might be an unreviewed safety question?

MR. WILSON: Yes.

MR. MICHELSON: Okay. So, if you make any changes, you've got to check with the staff to see if that's a change that might -- that they might want to re-review.

MR. WILSON: Right.

MR. MICHELSON: Is that the idea? Well, this is a fairly comprehensive list. For instance, Section 3-12, which deals with the piping, I guess any change in whatever the SSAR says about piping will have to be considered as a possible unreviewed safety question. Is that the way I read it?

MR. WILSON: Yes. I thought it was more limited than that.

MR. MICHELSON: It might be. I'm just trying to understand what you're telling me.

MR. WILSON: 3-12 tells you where in the text you go to read this. In the text, it will explain.

MR. POSLUSNY: It has to do with methodology, any changes in methodology that we approved.

MR. MICHELSON: Well, I thought there was more in 3-12 than methodology.

MR. POSLUSNY: Let me get that section.

MR. MICHELSON: Yes. We need to look at 3-12. I was just picking that as an example to understand what your proposed process is.

MR. POSLUSNY: Why don't we go on, and I'll find it, and then we can come back to it?

MR. MICHELSON: Okay. While we're on Section 1.2, I had one question which I need to get a clarification from the staff and, I guess, from GE.

If you go to page 1-4 of your FSER, the first full paragraph at the top of the page says, in essence, that the Japanese are doing their detailed K6/K7 design, and apparently, GE will only have access to the supporting design records through October 29th of the year 2001.

This bothers me a little bit in that, if there is a COL applicant that eventually comes along and you're in the middle of a design effort, it means that the supporting design information for the SSAR might not be accessible any longer, and that -- so, I need a clarification of exactly what does this mean and does the staff agree with it? The staff apparently agrees with it, from the SSAR.

MR. WILSON: We stated what the situation is. What an applicant who references this design would do is he would have to, as you know, establish this design and the details of this design, and to the extent he wanted to use that information, he'd have to make some arrangement, or he'd establish it himself.

MR. MICHELSON: Well, it further says that -- and I'm quoting here -- "detailed design information determined to be necessary to support the staff's review findings was firmly incorporated into the SSAR application." I interpreted that to mean that everything you need to know -- the designer needs to know is in the SSAR. Is that your interpretation?

MR. WILSON: No. What the staff needs to know to make their safety finding is in the SSAR, as we discussed before.

MR. MICHELSON: Yes, but these safety findings are based on certain assumptions concerning how the designer will now carry out this design, and the only thing the designer will have in front of him is what is in the SSAR, unless he somehow gets the Japanese to -- if this is after the year 2001, if he somehow gets the Japanese to give him the information, I supposed for a price or whatever, but it's a strange situation in licensing to say that here is a design we've reviewed and approved, but the basis for this design -- and there's a lot more than the SSAR -- that basis may or may not be available to the designer down the road.

MR. WILSON: Now, remember, in design certification, an applicant -- let's say I'm the applicant -- references this certified design. I'm not obligated to deal with GE or Hitachi or Toshiba or any of that group. I am only obligated to conform with the Design Control Document, and if I can establish the details of that design in conformance with that Design Control Document, I can do that with --

MR. MICHELSON: That's true, but in the spirit of Part 52, it escapes me to realize -- well, it bothers me to realize that Part 52 is being -- the person who carries out Part 52 to a COL stage may or may not have the information available to him that we had at the time of certification.

MR. WILSON: That's correct.

MR. MICHELSON: And I wonder if that's --

MR. WILSON: That's always been a provision of the rule, that once the rule is established, that person references it, it's up to them to establish the detailed design that's in conformance with the Design Control Document.

MR. MICHELSON: But to establish that detailed design, he has to have access to the basis for that preliminary design that was presented in the SSAR.

MR. WILSON: It would make it a lot easier.

MR. MICHELSON: In fact, it may not make it even acceptable to -- not to have that information, and yet, we're asked to certify that this process is okay. Something is missing. I just never realized that the information used to develop this whole thing that we're reviewing now will be possibly lost to the guy who has to pick it up and carry it through. That I never realized, and I don't know if the other Committee members ever realized that or not.

MR. WILSON: And in fact we put a special provision in the rule -- the section escapes me for the moment -- where we point out how we would approach a situation where someone references this design but doesn't use GE to --

MR. MICHELSON: Well, it isn't a question of using GE. I realize that one, but I never realized that, if one uses GE, they may still not have the information, because GE doesn't have it. It loses it in the year 2001.

MR. WILSON: Well, we put it in here to make it clear.

MR. MICHELSON: For the first time -- it was my first realization that that was the case.

MR. WILSON: The same as in the Draft Final SER, by the way.

MR. MICHELSON: Maybe GE has some words of comfort to say why this should all be okay.

MR. POWER: No. I think we're going to have to seek some guidance from the home office relative to these statements and items. We're not prepared to talk about that.

MR. MICHELSON: I realized you probably wouldn't, and I wouldn't do it if I were you either, but maybe when they come in February they will come prepared to address this issue and why GE can give us reason to believe this is a perfectly acceptable arrangement for a standard design, because it escaped me. I just didn't realize that was what was coming off, and that is, I think, a fundamental issue.

I think the design basis of -- the design we're reviewing and approving -- that basis for that design ought to be available to the fellow who is going to pick up this standard design and carry it through, and apparently it's not necessarily available, and I think the Commissioners ought to be aware of that. Maybe our report might so reflect the Committee desires.

MR. WILSON: Shall I proceed with the open items?

MR. MICHELSON: Yes, go ahead.

MR. POSLUSNY: Can we go back to item 3-12?

MR. MICHELSON: Yes.

MR. POSLUSNY: I provided the page, I believe, 3-182, that shows the unresolved safety question. It has to do with the methodologies in the piping.

MR. MICHELSON: Yes, but Section 3.2, methodology, is a rather broad scope of coverage. Let me see Section 3-12. That was my concern.

MR. POSLUSNY: We meant 3-12 in the FSER.

MR. WILSON: This index directs you to a section of the Safety Evaluation Report.

MR. MICHELSON: And 3-12 discusses only methodology, you're saying.

MR. POSLUSNY: That's the piece that's considered to be the unresolved safety question.

MR. MICHELSON: Okay. But that methodology was mostly the kind of stuff that shouldn't have been unresolved anyhow, because it was mostly standard methods of stress analysis, and I never understood that to be an unresolved issue anyway.

MR. WILSON: It's not unresolved. It's that, if you want to make a change, we'll require you to seek prior review and approval by the staff before you make that change.

MR. MICHELSON: Okay. But this doesn't address at all, then, the questions of how you do your pipe-break analysis and your sub-compartment pressurization and all that sort of thing. They can change any of that, and it won't be an unreviewed question.

MR. POSLUSNY: Correct.

MR. MICHELSON: You don't care if the structures blow down or not. You just want to make sure they do their right equations in their stress analysis. That's, I think, what you're telling me. It's very important to use the right equations but it's not important to make sure that, if they make changes in the rest of the methodology, that you're aware of it, and that's really where the concern is, is how they postulate the breaks, where they occur, and what effect it has on the structures.

MR. POSLUSNY: You still need to meet what is in the SSAR.

MR. MICHELSON: Yes.

MR. POSLUSNY: So, any change to that will get caught by process.

MR. MICHELSON: But apparently they can change what they said in the SSAR and it won't be an unreviewed question.

MR. POSLUSNY: Correct.

MR. MICHELSON: Relative to pipe breaks and compartment analysis.

MR. WILSON: Not necessarily. We're not speaking to all issues as to what is an unreviewed and what isn't an unreviewed safety question.

MR. MICHELSON: That's true.

MR. WILSON: In selected areas, we're saying in advance these are -- we want you to get prior review and approval, and we have identified those, and you see there's just a few of them.

MR. MICHELSON: I'm just giving my own opinion. In my own opinion, the stress analysis was the least questionable aspect of the entire business, least questionable. We know how to do that extremely well. You people know how to do it very well. You've been at it for 20 years, and there's nothing new there, and I don't think GE proposed anything new.

What we couldn't do is decide whether the structures were adequate, because we didn't know where to postulate the breaks, because you've got to have much more design detail, and therefore, you couldn't judge the structural capabilities at this stage of the game. So, you postponed that until later, but you didn't set up any methodology for it or any need to review that aspect or whatever.

MR. WILSON: I am not prepared to discuss that subject. If you want more details on this, I'd have to get our structural engineers down here.

MR. MICHELSON: I've got all the details.

MR. WILSON: Okay.

MR. MICHELSON: You've done a good documentation job. It's there, no question.

MR. WILSON: Okay. With regard to the open items, you'll notice on this list I have some different designations. This "F" here is significant. That indicates that the item is still open at this point in time.

In the DFSER, we had an item about the EPRI comparison, and that's been resolved by guidance from the Commission.

The proprietary justification -- that's still under review by the staff. We haven't yet received sufficient justification in a couple of areas, but we anticipate that will get resolved shortly.

This design control procedures --

MR. MICHELSON: Excuse me. On the "F" items -- and there are a number of them in here -- I looked -- for instance, you list on page 1-11 item F14.3.3-1 to be -- the description of the item is ACRS comments on piping DAC. I went to F14.3.3-1, and I didn't find anything discussing ACRS comments. What does this description here mean, and why is it in an "F" number?

MR. WILSON: It's an "F" because -- by the way, that's a confirmatory item, not an open item, but it's an item that hasn't been resolved yet. It's still open at the time this was issued.

MR. MICHELSON: What does "F" again mean then?

MR. WILSON: We have our old numbering system we use in the Draft Final SER, and we're still retaining that, but we didn't want to confuse you between these numbers, and so, if it's still open at the time we issued the advanced version of the SER, it has an "F" in front of it.

MR. MICHELSON: So, this item is still open, but it's open as a confirmatory item?

MR. WILSON: Yes.

MR. MICHELSON: Is that because you haven't decided yet quite what they need to confirm?

MR. WILSON: No, we haven't gotten the information to --

MR. POSLUSNY: We probably had discussions with them, may have seen markups.

MR. MICHELSON: Okay. However, I must point out, I didn't find any discussion of ACRS comments in there, which is suggested by the title on page 1-11. I have the same suggestion on page 1-10. Item F14.3.3-1 says ACRS comments on fire and flooding design.

MR. WILSON: The correct number should be 14.3.2.3.1-1.

MR. MICHELSON: Okay. 14.3.2.3.1-1.

MR. WILSON: On page 14-46 is the correct location of that description.

MR. MICHELSON: Okay. The same is true of item F19.2.3.2.1-1, ACRS concerns with equipment tunnel protection.

MR. WILSON: I'll check that.

MR. MICHELSON: Would I expect to find a discussion of our ACRS concerns?

MR. POSLUSNY: We've got a typo on that. I didn't have any corrected version here. I'll clarify it before lunch.

MR. MICHELSON: Okay. If the description is that it's going to address ACRS concerns, then I would expect to go to that item and find ACRS concerns addressed.

MR. POSLUSNY: It is discussed. I'll find the section shortly.

MR. MICHELSON: Okay. You're finally all settled on equipment tunnel protection, I guess. It's just a matter of finding the discussion.

MR. POSLUSNY: It's still an open item, though.

MR. MICHELSON: It's still an open item in the sense, I guess, there's something still to be coming in, and eventually the "F" will be dropped off the listing. Is that "F" going to drop off prior to -- or at the end of February? Is that the target.

MR. POSLUSNY: When we publish the NUREG, these will be discussed as resolved items.

MR. MICHELSON: When do you intend to publish the NUREG?

MR. WILSON: I'll get to that in my next slide.

MR. MICHELSON: Okay.

MR. WILSON: Item 1.2.6-1 I discussed at the last meeting on the scope of the design. That issue is resolved, and the resolution is described in the Safety Analysis Report at 1.1.2.

Finally, as I said earlier, the COL action items, we still have a few of those that need to be incorporated in the Safety Analysis Report, but we're nearing completion with that.

MR. MICHELSON: On the scope of design, I'm still a little confused as to what is the scope of the design. There are various things that GE has not designed but has given us design requirements, and I guess they are deemed to be then as a part of the scope of the design, but basically there are some interfaces, and that's the part that I'm a little confused on.

MR. WILSON: This diagram is shown on page 1-14 of the SER that you have, and this, in effect, delineates the scope of the design that we're reviewing.

MR. MICHELSON: Does that mean everything within these listed items --

MR. WILSON: Yes.

MR. MICHELSON: -- is a part of the scope?

MR. WILSON: Right. And that's described in more detail in Section 1.1.2, and there it describes systems that are partially in and partially out of the scope and where the break-off is.

MR. MICHELSON: Where is that described, the break-off?

MR. WILSON: 1.1.2 of the Safety Analysis Report.

MR. MICHELSON: 1.1.2. Okay.

MR. WILSON: Now, remember, within this scope, there is a range of level of detail. Some information has a lot of detail in the design and some has very little. That level of detail varies, as I discussed last -- I think it was last month -- on this subject. It varies according to the level of information the staff needed to make its safety findings. So, within this scope, you'll have a variation in the level of detail.

MR. MICHELSON: Now, let me ask you -- for instance, the tunnels are an example of an item that is, I guess, fully within the scope of the SSAR.

MR. WILSON: Yes.

MR. MICHELSON: However, the degree of detail given for them will vary, but it has to give enough detail to prescribe all important safety aspects of the tunnels, including the structural design and the water tightness, the ability to keep water out of the tunnels, and the interfaces. All of that has to be somehow described in the SSAR.

MR. WILSON: Whatever the staff needs to make its safety finding, and the staff is -- did you want to discuss it now?

MR. BURTON: When we get to Section 9.2 -- Butch Burton from NRR -- we've got a number of systems that are interfacing systems, and part of our presentation is to go through those, and we'll talk a little bit about them.

MR. MICHELSON: What do you mean by an interfacing system?

MR. BURTON: Interfacing system is any system that either -- well, at least for the ones that we're going to talk about in 9.2, part of the system is within scope, part of the system is out of scope. One of the examples is reactor service water, where part of the system is in scope, meaning it's within the in-scope buildings, and part of it is out of scope.

MR. MICHELSON: Service water I think I understand. The tunnels I'm not sure. Are there any interfaces? Since the tunnels only connect safety-related -- all except rad waste building.

MR. WILSON: The tunnels, as shown here, are all in scope. So, there's no interfaces.

MR. MICHELSON: So, they're all in scope. So, I expect no interface requirements. I expect the full definition of design requirements as the tunnel intersects with the reactor building, for instance.

MR. BURTON: Those aspects of the tunnel design that are -- that should be raised up into Tier 1 will be.

MR. MICHELSON: Well, they aren't raised into Tier 1. I already know that. They're buried in Tier 2, if they're there at all.

MR. BURTON: As part of the building ITAACs -- reactor building, control building -- there are going to be certain requirements. The tunnels don't go through the buildings, okay?

MR. MICHELSON: But they interface with the buildings.

MR. BURTON: There is an interface with the buildings.

MR. MICHELSON: Right.

MR. BURTON: And those aspects that are Tier 1 are going to be -- would be identified in part of the --

MR. MICHELSON: So, you're saying, I think, an important aspect --

MR. WILSON: Can I interrupt? Be careful with this little interchange. When you talked about interface, you don't mean it in the terms of Part 52.

MR. MICHELSON: No. Let's use the word "intersects."

MR. WILSON: Thank you.

MR. MICHELSON: Where it intersects the buildings, that's going to be a Tier 1 requirement on that intersection?

MR. BURTON: No. Where the intersections are, those aren't interface requirements. What will be Tier 1 will be those aspects of the tunnels that deserve Tier 1 treatment.

MR. MICHELSON: Do you know offhand what those might be?

MR. BURTON: Well, the -- the tunnels that we're talking about?

MR. MICHELSON: Yes. Well, mainly, it's only one big tunnel we're talking about that is of concern at the moment, and that is the rad waste -- so-called rad waste tunnel.

MR. BURTON: Okay.

MR. MICHELSON: That's the real big one.

MR. BURTON: Yes, that's the real big one.

MR. MICHELSON: Very large intersections with safety-related buildings.

MR. BURTON: Right. But the biggest one from -- really, from a safety aspect, is the tunnel that carries the reactor service water.

MR. MICHELSON: Well, I think that you'll find the rad waste can be equally important from the safety aspect if you have a site flood or something of this sort.

MR. BURTON: Right. That's right. Part of the problem is that you haven't seen -- you raised the issue of tunnels before, and one of the things that we're doing with GE is we're clarifying exactly what those design requirements are.

MR. MICHELSON: You can tell me later when this is all going to happen, but boy it looks like we're still talking the future, and I thought this was the end.

MR. BURTON: No. We have got some agreement with GE. It's just in the SSAR yet. Unfortunately, at the moment, we're not prepared to --

MR. MICHELSON: Maybe GE is going to tell us tomorrow.

MR. POWER: This is John Power. We are going to discuss tomorrow three areas. Number one is the dialogue we're having with the staff relative to those tunnels, the commitments to information -- additional information you requested at the last two meetings relative to it, and adjustments that would be made to the SSAR relative to that information, and we're prepared tomorrow to discuss all three areas.

MR. MICHELSON: Okay. But none of those have yet been -- they're in progress.

MR. POWER: We've wrote up the words, we have the adjustments to the SSAR, corrections, for your display. We have answers to the questions and answers to the staff questions.

MR. MICHELSON: So, those are all in writing in the handout you'll give us?

MR. POWER: Yes, that's correct.

MR. MICHELSON: Well, maybe that will be good enough, then.

MR. WILSON: I thought I'd spend a couple of minutes explaining where we go from here. As you know, you've received our advanced version of the SER. We issued that in December to facilitate the process and complete the ACRS review.

Unfortunately, we still had a few open items in that version of the SER, and so, our top priority right now is to resolve those open items, and what we plan to do is provide page inserts to this version -- this loose-leaf version of the SER that you have before you, and as soon as we get that information from GE, we will make some changes to the SER showing the resolution of those items and provide those to the Committee.

MR. MICHELSON: Do you have a rough idea of when those page inserts will be available?

MR. WILSON: I'll let Mr. Poslusny take a guess.

MR. POSLUSNY: Our best guess would be no later than the end of February.

MR. MICHELSON: Okay. They'll be available before we have our wrap-up meeting on March 9th.

MR. POSLUSNY: We're trying to do that. We're not talking about, you know, hundreds of pages.

MR. MICHELSON: No, I hope not. Yes. Yes. And that will --

MR. WILSON: And you saw the list of open items that we were just talking about.

MR. MICHELSON: All right.

MR. WILSON: Now, in addition to that, as the Committee knows, we have had concerns that we've expressed in the past about the internal consistency of the document, and because of that, we've formed three groups to take care of what we have identified in the SER as confirmatory item F1.1.-1. Those three groups are to verify the documents we're reviewing -- the Safety Analysis Report, the Technical Specifications, and the Certified Design Material, which you heard about in December.

Now, the first group is the reviewers that did the review. They are looking at Amendment 33. Remember, this SER you have before you addresses up to Amendment 32. They're reviewing Amendment 33 and comparing that against the Technical Specifications and the Certified Design Material and verifying that what they said in the SER is, in fact, still correct and supported by that underlying Safety Analysis Report information. So, that review is ongoing, and I think it's basically complete.

MR. POSLUSNY: It's completed except for one branch, and we're sending a package out to GE this afternoon.

MR. MICHELSON: Now, is that what you mean by internal consistency, that what's in 33 doesn't disagree with --

MR. WILSON: Right. We want to be sure it still supports what we said in the SER and, if it doesn't, to get that clarified.

MR. MICHELSON: I have a little different concept of internal consistency.

MR. WILSON: Well, let me finish. Remember, we have three groups here.

MR. MICHELSON: Okay.

MR. WILSON: The second group is what we call our independent review group. We've taken people that were not involved in the review at all, primarily people who are headquarters inspection -- would have headquarters inspection responsibilities. We've also brought in some people from the region. We've trained these people on the Part 52 review process, and then we've had them look at the Safety Analysis Report up to Amendment 33, the bases in the Technical Specifications, and this SER to make sure that there is internal consistency amongst those documents. So, this is a fresh pair of eyes, if you will, and they are looking at the documents, and they are providing information to us.

MR. MICHELSON: The problem with doing it with a team is that you kind of divide the package up amongst a team, and the internal consistencies, some of which I have at least observed, are not -- the problem you get into is that Chapter 8, dealing with electrical, says something, and you go over to 9, dealing with fluid hydraulics, and there's a disconnect.

You've got to make sure that the reviewers are looking across the spectrum for the disconnects and not looking within Chapter 9 or just within Chapter 8, because within the chapters they seem to be reasonably good, between chapters there's sometimes serious breakdowns of consistency.

So, you've got to make sure, somehow, that the guy looks -- every one of the reviewers has to read the whole document, which is almost an impossibility.

MR. WILSON: The team meets internally amongst themselves to deal with those issues, and then the output of their comments is taken to another group.

MR. MICHELSON: The point I'm trying to make is that the people don't realize there is an internal inconsistency, because everything they looked at was fine in 8 and everything they looked was fine in 9, and so, they don't even discuss amongst each other the differences, because they didn't know there were any differences. It wasn't until somebody read both 8 and 9 that they realized that it wasn't saying the same thing, as an example.

MR. WILSON: But also, by looking at it from the standpoint of the Tier 1 material and the tech specs, you get that cross-cut.

MR. MICHELSON: Yes. Because there you can see the direct inconsistency between reading 9 ITAACs and then reading Chapter 9 of the SSAR. You can also pick up those inconsistencies, and I assume, clearly, the Tier 1 material has to be for sure correct and everything else has to hopefully be consistent with it.

MR. WILSON: Now, the output of that group -- that group has just recently finished their work, and they have provided us a report, and that's being reviewed by the review team that reviewed ITAAC to be sure that their comments aren't inconsistent with our ITAAC review policy, and that screening group is headed up by Mr. McCracken, who is with us here today, and as soon as they finish reviewing that material, we'll send that to GE.

Finally, we had a third team that was brought in, uses some contractors and our tech spec reviewers, and they're reviewing the tech specs against the standard tech spec and the SSAR and the Tier 1 material and making sure that's all consistent.

So, we've had three different groups that have been running in parallel throughout the latter part of December and early January that are checking all this material.

The output of all that effort is going to be sent to GE and provided to them for this last effort to get their Safety Analysis Report document correct.

MR. MICHELSON: It must be almost imminent, then, to be sending it to them, because this is almost the 1st of February already. Would you be prepared to discuss, at this time, what you have found from these groups, or are there reports still to come to you?

MR. WILSON: We're not prepared today. What I would suggest is perhaps we could provide something at the February meeting.

MR. POSLUSNY: I can give you preliminary information on the tech spec audit, a handful of comments. They feel --

MR. MICHELSON: Now, are they looking at Amendment 32 or 33?

MR. POSLUSNY: Thirty-three.

MR. MICHELSON: Thirty-three.

MR. POSLUSNY: Yes.

MR. MICHELSON: Okay. We'll see what they come up with. Can we hear, then, in February -- in other words, so far, at least the material I've looked at has a number of inconsistencies in it. I would like to be assured that it's been carefully scrubbed and that -- you know, that the level of inconsistency now is at an acceptably low level, and somebody has to assure me that that's been taken care of, and so, a staff presentation in February would do it.

[Slides.]

MR. WILSON: Now, as I show here in the slide, we're going to take those comments and send them to GE.

Now, while that's going on, we have a couple of other efforts that are going on. As we said when we put out this SER, we haven't done all of our normal editorial work, and so, there is a review going on right now by our technical editors to look at the document as a whole and give it that single author perspective. I anticipate some editorial comments from that. That's going on right now.

Also, as I said, our review by Office of General Counsel to be sure the document is legally correct is ongoing, and I expect some interaction between our lawyers and the staff reviewers on that.

MR. MICHELSON: In that regard, maybe you could help me out on one small point. We've heard for a long time now -- we started out using DACs, and then we decided they were ITAACs, and then there were DAC ITAACs, and then -- on and on, but could you tell me now, do we have any DACs?

MR. WILSON: From a legal perspective, the correct term is ITAAC for all of them, and you'll see the Certified Design Material is prepared that way. It's just that, within the ITAAC world, there's a range of ITAACs. Some of them are simple verifications, and some of them are a process.

MR. MICHELSON: I think I understand that part, but tell me, then, for your SER, what is your policy concerning DACs? Are there going to be DACs in the SER?

MR. POSLUSNY: They're discussed as DACs.

MR. MICHELSON: I'm afraid they are. Some writers discuss them -- they talk about the Chapter 3 Certified Design Material. The others talk about DACs and say there's six DACs with this one, which I think is still confused. I think you ought to decide what you've got, and either you've got DACs or you don't. If you do, define them and indicate how you're using them or get the word out of the SER altogether.

MR. POSLUSNY: Let's talk more in detail when we talk 14 this afternoon.

MR. MICHELSON: Okay. I've give you the examples then, because it's very confusing. I thought I understood it, I think I still do, but I believe your SER doesn't quite jibe with what I think the way the policy is.

MR. WILSON: It has become a term of art that is descriptive for some people, and so, when they're writing, people find it's useful to say that that's what we're talking about.

MR. MICHELSON: You ought not to do that for your SER, though. You know, at that stage of the game, you ought to just scrub it out and use the right terms.

MR. WILSON: Then, finally, as we do this editorial work on the SER, we also want to address the ACRS letter and any comments you may have there that we feel we need to address.

MR. DAVIS: When are you expecting to receive that?

MR. WILSON: We're patiently waiting. We're going to make a presentation in February where we're going to speak to that, but we believe that, if we can get these open items resolved in the timeframe that Mr. Poslusny has said and we can clear that up in your March 9th meeting, that the Committee would be in a position to write a letter in March at your full Committee meeting. So, that's what we're hoping for at this time.

MR. DAVIS: Thank you.

MR. MICHELSON: The official position of the Committee is that you will have the letter in the April meeting. Certainly, of course, if everything goes to bed and we've got a clean draft to present to the Committee in March and they just are happy as hell, yes, we might even get it out in March. I'm not sure yet. I have no feel for how the Committee will react.

MR. WILSON: Now, as I said before, we are going to provide a number of comments to GE on the results of this verification effort, plus they will need to make some changes in their Safety Analysis Report to deal with the open items, and so, we are expecting an Amendment 34. It is the position of the staff that we would like to see that delayed until they can deal with all these issues in one final amendment. It is very resource-intensive to deal with multiple amendments, and so, we are encouraging GE to do one last amendment to get all this wrapped up. We will verify that amendment against our SER to make sure that is correct, and then we will be prepared to issue the Final SER as a NUREG report.

Now, there is one matter that deals with the timing of the Final Design Approval that has not been resolved yet, and that is a bullet here I have identified as deciding on the review of the Design Control Document.

We have recently sent a letter to the Commission, dated January 13th, requesting them to give a waiver on a restriction they had placed on us earlier dealing with the ability of the staff to make changes after the Final Design Approval is issued.

If the Commission gives us that waiver, we are going to agree with GE's request to delay the review of the DCD until after the Final Design Approval is issued, and if that happens, then as soon as we get the SER out, we'll prepare a document that will constitute the Final Design Approval. It will be conditioned on the satisfactory approval of the Design Control Document, and we'll issue that -- depending on the timing of the ACRS letter -- presuming the ACRS letter is issued in March, the staff should be able to get the SER out in April and get the FDA out in May, something like that.

MR. MICHELSON: Now, our letter will be conditional that we certainly aren't going to sign off on what you may change after we write our letter.

MR. WILSON: I understand.

MR. MICHELSON: I think we would be ill-advised to do that.

MR. WILSON: We're not asking for that.

MR. MICHELSON: Assuming that there are no big things changed, it wouldn't make a bit of difference. If some big things change, I guess if you want, you know, our endorsement of that change, you'd have to come back and we'd have to write another letter on it.

MR. WILSON: That's correct. As I said before, though, we anticipate having the open items resolved and that documentation to you before the March meeting, and that should take care of all the significant issues.

MR. MICHELSON: I don't know what's left.

MR. WILSON: Editorial stuff is what we're anticipating.

MR. MICHELSON: It it's just editorial, it won't make any difference.

MR. WILSON: That's what we're anticipating at this point.

So, anyway, that decision from the Commission is going to affect the timing of the Final Design Approval, and it may be the May or June timeframe, depending on how all these things work out.

That's all I have to say on where we go from here in the process, if there are any questions on that.

MR. POSLUSNY: Could I make some changes for the record? There was questions on an open item and a confirmatory item.

The first one was an open item on the equipment tunnel protection, an ACRS concern. It is discussed on page 19-56. We didn't specifically indicate it was an ACRS concern. We adopted it as an open item and wrote it up as such.

MR. MICHELSON: You'll fix the description of the item, then, on page 1-11? It certainly doesn't discuss ACRS comments. I just couldn't find anything -- I didn't even find the word "ACRS" anywhere.

MR. POSLUSNY: Okay.

The second item was a confirmatory item, 14.3.3.

MR. MICHELSON: Okay.

MR. POSLUSNY: It should be 14.3.3.3-1.

MR. MICHELSON: Hold on just a minute.

MR. POSLUSNY: On page 1-11.

MR. MICHELSON: 14.3.3.3. Okay.

MR. POSLUSNY: And it's located on page 14-76.

MR. MICHELSON: It doesn't say anything about ACRS, I'll bet, either.

MR. POSLUSNY: No.

MR. MICHELSON: You're going to fix all these descriptions.

MR. POSLUSNY: Yes.

MR. MICHELSON: The suggestion is that, to find out how you addressed the ACRS concerns, you go to these sections, and yes, you might interpret that --

MR. POSLUSNY: It's misleading.

MR. MICHELSON: -- but it really is kind of misleading, because they don't even mention what our concern might have been --

MR. POSLUSNY: Correct.

MR. MICHELSON: -- if any and how you addressed it. Okay.

MR. WILSON: If there are no further questions on this subject, I am prepared to turn it over to Mr. Burton, who will speak on Chapter 9.

MR. MICHELSON: Before you leave that, let me just flip through the pages real quick. I think you touched on most of what I had.

I had a small question on page 1-5, item 1.2.5. It's GE's agreement with the Japanese, and the last sentence says that, under the TCA, which is the Technical Cooperation

Agreement, GE has been able to obtain detailed design information with a lead time of about two months.

Does this mean that every time you have a -- and I'm asking this of GE -- every time you have a question raised, it takes two months for the Japanese to give you an answer? Is that what that means?

MR. EHLERT: No. It takes two months for the -- this is Gary Ehlert from GE. It takes roughly two months to -- from when GE formulates a question, submits it to Japan -- or I should say to our legal staff, who puts it into a formal letter which gets sent to Tokyo, then it gets transmitted to the representative company, either Hitachi or Toshiba, and processed by their staff. They estimate the hours to go against their TCA agreement. It goes down to technical staff. They actually put together the package and routes it back through.

MR. MICHELSON: Put together the answer and send it back?

MR. EHLERT: Yes.

MR. MICHELSON: It does take two months to get an answer, then.

MR. EHLERT: Up to two months. Some answers we get through a phone call, immediate, and some -- it depends on what the question is. If it's -- if we're looking for detailed design information, it's two months. If we're looking for a simple question answer, it could be a matter of a couple of days through a fax.

MR. MICHELSON: If I understand your contract correctly, that you can continue to ask these questions until October 29 of the year 2001, and then they have no obligation to answer after that?

MR. EHLERT: That's based on -- that's on the contract date, and the contract gets renegotiated periodically.

MR. MICHELSON. Well, we could, but we have no way to know that that will again happen after the FDA is issued, but this is a cumbersome arrangement when the controller of the design has those kind of delays built into answer questions and, furthermore, has no obligation to even answer after the year 2001, and we're supposed to give a Final Design Approval for a design arrangement like that? I don't know. Okay. Something for the Committee to think about, anyhow.

[Pause.]

MR. BURTON: Good morning. My name is Butch Burton. I'm representing the Plant Systems Branch in NRR, and we're going to be talking, I guess for the rest of the morning, about Chapter 9.

Basically, Chapter 9 consists of five sections -- Fuel Storage and Handling, Water Systems, Process

Auxiliaries, HVAC, and then Other Auxiliary Systems, which is primarily fire protection system and diesel auxiliaries.

The first section, Fuel Storage and Handling, consists of five subsections -- New and Spent Fuel Storage, Fuel Pool Cooling and Cleanup, and then both Light and Heavy Load Handling.

Now, my first substantive viewgraph is going to start in 9.1.3. What I've tried to do, since Chapter 9 is such a big chapter, is I wanted to focus on two things: number one, some of the issues that came up with the Committee back at the draft stage and how we ultimately dealt with those, and then anything else that has occurred since then that we thought might be of interest. Beyond that, most of the things were fairly straightforward or things that you had seen before.

So, I guess, briefly, I don't have any viewgraphs for New and Spent Fuel Storage. I just wanted to say about those two -- new fuel storage has a 40-percent capacity, 40 percent of full core, spent fuel has a 270-percent capacity. Much of the design details of the new and spent fuel racks are going to depend on who the applicant buys the racks from. So, a lot of the issues such as criticality analyses and load drop analyses, those have all been put on the COL applicant, and the SSAR reflects that.

MR. MICHELSON: When you say they have 270-percent capacity for spent fuel, is that with a fully-loaded pool, or is there still room to unload a core if you have to?

MR. BURTON: That represents, what, two, two-and-a-half cores, or a core-and-a-half? I can't remember.

MR. MICHELSON: Yes, but how much spent fuel can you store and still offload a reactor if you get into a problem?

MR. BEARD: This is Alan Beard from GE. The 270 percent is meant to represent the fuel pool has the capacity to contain the bundles of 2.7 cores.

MR. MICHELSON: Okay.

MR. BEARD: So, you can have 1.7 cores in there and still offload the reactor.

MR. MICHELSON: Okay. So, you can still offload after a little over 1.7 cores. Okay.

MR. BURTON: So, we're going to start with fuel pool cooling and cleanup. Fuel pool cooling and cleanup is a non-safety-related system, Seismic Category 1, Quality Group C, for the entire system, with the exception of the filter de-mineralizers. There is a -- I have used the Tier 1 drawing that's in your package after page five, which would help in some of the explanation, and what I'm saying, basically, is that the entire system is Seismic Cat. 1, with the exception of the filter de-mineralizers right here.

MR. MICHELSON: I have at least one question on fuel storage. On page 9.1-30, it talks about the -- there is a vent opening that apparently has to be made water-tight in the process of watering the reactor cavity. Could you tell me more about that vent opening?

MR. BURTON: Okay.

MR. MICHELSON: What is it there for, and why is there even one there?

MR. BURTON: You're ahead of me here.

MR. MICHELSON: Section 9.1 is the fuel storage and handling.

MR. BURTON: Oh, you're in the SSAR or the SER?

MR. MICHELSON: I'm in the SSAR.

MR. BURTON: Oh, okay.

MR. MICHELSON: I didn't know if I was ahead or behind you. If you want to wait, we can do it later.

MR. BURTON: Okay. I'm sorry. Ask your question again?

MR. MICHELSON: There's apparently -- and this is really a GE question, really, but I don't know if GE will even go over it otherwise. It's on page 9.1-30. There's apparently some openings that have got to be made water-tight, and I'd like to know about those, if they are ventilation openings, particularly.

MR. BEARD: Alan Beard again.

To maintain cooling underneath the drywell head through the seal plate, which is the plate that transitions from the reactor vessel and the refueling bellows out to the containment wall, there are openings which are ducted, and there is air supply by the coolers up into that drywell head area to maintain cooling up there.

When you are preparing for a refueling outage, once you remove the drywell head, you would remove the duct extensions that are mounted to those flanges, and you would install blind flanges on those that now provide a seal so that you can flood up the cavity.

MR. MICHELSON: What HVAC system is that attached to?

MR. BEARD: That is the drywell HVAC systems, the drywell coolers.

MR. MICHELSON: Okay. How can that be? Are these inside or outside containment?

MR. BEARD: They are inside the drywell head space, so they are inside primary containment. This is an arrangement very similar to what we have on the Mark II's.

MR. MICHELSON: Okay. I was thinking this might be something that was up in the concrete space above the head that you had to ventilate to keep it cool during normal operation. There is nothing up there in the ventilation --

MR. BEARD: No.

MR. MICHELSON: Okay. Okay. That takes care of it.

Now, the reason for making them water-tight is -- if the water-tight arrangement were to fail, the worst that happens, you start flooding the drywell, then.

Now, this is another avenue by which you can dump the entire water capacity of the pool and so forth into the drywell.

MR. BEARD: The standard practice on plants -- like I said, this is an arrangement very similar to a Mark II -- is when you start the flooding, you position people in the drywell to observe these hatches or blind flanges and make sure there's no leakage.

MR. MICHELSON: Well, I was thinking of something slightly different than that. I was thinking of dropping a concrete block sometime and impacting on one of these covers and thereby dump the canal into the lower cavity.

MR. BEARD: These plates are typically three-quarter-inch steel plate.

MR. MICHELSON: Okay. You didn't have any details. It just said it was water-tight, and three-quarter-inch steel plate might or might not do the job. If the plate were warped because it got impacted, how do you shut the flow of water off?

MR. BEARD: You would have to -- again, I'm getting into postulations now, but you're in an emergency situation. Your ECCS systems would be capable of making up that whole -- you'd maintain water level, you would re-install the fuel pool gates, and then at that point you could let water level decrease down to the vessel flange using RHR decay heat removal to remove heat from the vessel, and you could go down and repair the damage.

MR. MICHELSON: Where physically are these openings? Are they right at the --

MR. BEARD: They're at the elevation of the vessel flange, in effect, I guess.

MR. MICHELSON: Okay. They may even be protected. If I knew where they were, I could make a judgement as to how well protected they are or maybe how vulnerable they are, but not knowing anything about it, I kind of wondered -- I never heard, you know, a discussion of these before, and I didn't know if it was something new or just something that had never been looked at.

MR. BEARD: I will see if I have a drawing of that area for you.

MR. MICHELSON: The staff might also check to see if they ever looked at these -- these ventilation openings to see if they were a possible source of dumping. There must be quite a bit of water in the upper cavity there above the head when you're doing refueling, and it could be a rather rapid dump, depending on the design of all of this and how vulnerable it might be. I'm not worried about a leak. I'm really worried about a catastrophic failure for whatever reason. But it is something -- I just didn't realize there was a ventilation opening up there to be plugged before you -- how do you plug that?

MR. BEARD: I do have a diagram that can give you an idea of where this is.

MR. MICHELSON: Okay. How do you plug -- how do you get to the location to do the plugging?

MR. BEARD: This is Alan Beard again. The area we're talking about this plate right here. There are holes through that would provide ventilation up to the drywell head area, and as you can see, that is part of the primary containment area.

MR. MICHELSON: Okay.

MR. BEARD: Now, access during a normal outage, you would have removed the drywell head --

MR. MICHELSON: Yes.

MR. BEARD: -- and you have personnel access down in this area, and they install the plates with the rubber gaskets or whatever they're using and bolt them down.

MR. MICHELSON: So, they go down there and install those before they allow the water to enter the area.

MR. BEARD: Yes. They would do that in conjunction with detaching the reactor vessel head and removing the insulation and all the other work that goes on in that cavity.

MR. MICHELSON: So, those plates are a part of the bellows support arrangement.

MR. BEARD: Yes. They're part of the seal plate, and the bellow is connected to the seal plate.

MR. MICHELSON: Yes. And they are facing straight up, then.

MR. BEARD: Yes.

MR. MICHELSON: Okay. So, if you dropped a concrete plug into this area, you could very well drop it right on those plates. How strong they are is another question. I don't know.

MR. BEARD: Again, this goes back to what we discussed the last time we met. We don't expect that you're going to be handling concrete plugs in this area once you remove the reactor vessel head.

The only plug you might be handling would be the last shield plug in the canal between the spent fuel pool and the reactor cavity, and that's sometimes left in place to provide additional personnel shielding while all these activities are going on.

MR. MICHELSON: So, you will have a prohibit, so to speak, on any handling of heavy weights over the open core once the head is removed.

MR. BEARD: Yes. We're following the requirements of NUREG-0612 which controls heavy loads.

MR. MICHELSON: Well, I thought that was kind of the approach you gave me last time. So, I went on and read a little more of the SER and have, then, a question on what your intentions are. If you go to Figure 9.1-12 in the SER --

MR. BEARD: Which is a schematic of the refueling outage, yes.

MR. MICHELSON: Yes. What they show there is that the slot plugs are put in before you flood the pool, and then, after draining the pool, the shield plugs come out -- it's not clear that they come out after the head is on. In other words, it's not clear that you're handling after the head is on. It's a drawing in the big book. It's drawing 9.1-12, and they replace there -- they show the slot plug to be coming out before you put the drywell head back on, and I would have thought you'd put the drywell head on and then you'd remove the slot plugs.

MR. BEARD: I'd want to look at the diagram, but I believe the protection is provided by the reactor vessel head being in place at this point.

MR. MICHELSON: Well, that's what I thought, too.

[Pause.]

MR. MICHELSON: The question is, is it going to be an acceptable practice to move those plugs before the head is on?

MR. BEARD: And the answer to that would be no, it is not an acceptable practice.

MR. MICHELSON: Okay. Then it should be shown on the drawings, and it should be clearly stated in the SSAR that it's not an acceptable practice, and the staff should evaluate the safety accordingly. I guess -- I don't know how the staff evaluated safety in this case, but I have to evaluate it with the head off, since it's possible to have the head off. I couldn't find a prohibit on it.

MR. BURTON: Well, as I said before, a lot of the protection of some of this equipment is left up to the COL applicant as part of their load drop analysis. What I would anticipate is, if for some reason they felt like they wanted to make that operation with the head off, they would have to provide some additional protection.

MR. MICHELSON: I guess I'm beginning to not understand what this certification process is all about. I thought these were pre-arranged agreements as to what was permissible and what was not permissible, and we'd do it up front so we didn't argue later, and now we aren't doing it up front, we're going to argue later instead.

MR. BURTON: Well, I'm going to go back to the original understanding, which was that they are -- in some cases, there are some things -- some pieces of equipment that we simply do not know how things are going to fall out until the applicant decides exactly what they're going to do and how they're going to do it, and I think that this particular issue is one of those.

We don't know precisely what kind of crane they're going to use, what kind of safety features that crane will have. They are going to have some flexibility in terms of what --

MR. MICHELSON: Therefore, you're putting boundary conditions on what they're going to be allowed to do up front. You put the boundary conditions on up front and settle the details later, but there is not presently a boundary condition that says that you have to have the head on before you handle the heavy concrete.

MR. BURTON: No. That's correct.

MR. MICHELSON: Therefore, I expected you to evaluate the safety with the head off as the worst case.

MR. BURTON: Okay. Part of the issue is going to be, I think, addressed when we get to the heavy load handling section.

MR. MICHELSON: Okay. We'll hold it until later. I didn't mean to get ahead of your discussion that far, but I just wanted to fit it in.

I just wanted to point out to GE that it is permissible to do this without -- with the head still off. I thought there would be a prohibit on it, but apparently there's not, and therefore, I expect you to evaluate the safety with the head off.

Why don't you proceed?

MR. BURTON: All right. One of the issues that came up at the draft stage was exactly what kind of capacity does the fuel pool cooling system have, and we tried to clarify that.

The fuel pool cooling system does not have the capability of cooling -- of accommodating the heat load in the pool at any time.

Basically, the heat load in the pool, up to 21 days after shutdown, cannot be handled completely by the fuel pool cooling system by itself. It has to be supplemented by RHR.

Following 21 days, when you do have the gates closed, at that point the heat load has dropped off enough that fuel pool cooling, both divisions, can handle the heat load, but even then, in that condition, after 21 days, if you lose one of the two trains, you would have to use RHR again, possibly, depending on exactly what the head load is, to accommodate the full heat load, and that's all been clarified in the SSAR, but at the draft stage, there was still some confusion about that.

The next thing I want to do is talk about -- well, another issue that came up at the draft stage, and that had to do with one section of piping that we have here.

There are a number of ways to get water into the pool, and I'll talk about it a little bit later, but on this drawing the main ones are two trains of RHR, suppression pool cleanup, as well as the return line for fuel pool cooling.

As you can see, all of these meet up in one piping section here, and we were concerned about that in that, during normal operation, that's the only line that we have available to bring water in.

During refueling, you have other means of getting water into the pool that's not shown here in Tier 1. Also, what's not shown here is there is a make-up source from make-up water condensate, but we were concerned about this one section of common piping and its ability to withstand pipe failures, things like that.

MR. MICHELSON: What is its design pressure, and what is the anticipated operating pressure?

MR. BURTON: I'm sorry. I don't have those numbers off the top of my head.

MR. MICHELSON: That has something to do with whether this is a high- or low-energy line and all that sort of thing.

MR. BURTON: I don't remember the normal operating pressure.

MR. MICHELSON: It would be important to know that. I had a concern about that same line and was going to ask you a question, which I guess is as good a time as any, and that is that, if you were to rupture that common piping and the check valve didn't hold, I'm not sure that check valve even gets any kind of surveillance.

MR. EHLERT: This is Gary Ehlert, GE. That line is a moderate-energy line.

MR. MICHELSON: It's moderate-energy?

MR. EHLERT: Yes. It's down around 100 psi, less than 212.

MR. MICHELSON: And what size piping?

MR. EHLERT: Eight-inch, I believe.

MR. MICHELSON: What schedule?

MR. EHLERT: I would have to look at the P&ID. I don't know right off the top of my head.

MR. MICHELSON: It's probably a low probability of failure, since it's very low-pressure, but it does look like -- I couldn't find it, but I assume that -- pictorially, you showed the line going as you did to the bottom of the pool. Does it really go to the bottom of the pool or only part-way to the bottom?

MR. BEARD: Alan Beard. Yes, the line does go to the bottom of the pool, and it's meant to help eliminate the thermal stratification, but there are requirements to have syphon breakers on those discharges.

MR. MICHELSON: Is that in the SSAR and I just missed it? There will be syphon breakers on the pipe as it leaves the pool.

MR. BURTON: Yes, that's there.

MR. MICHELSON: With that in mind, then, rupture of the pipe is not going to syphon out the pool to some other location.

MR. BEARD: That's correct.

MR. BURTON: All right. And then the only other aspect that we added was, depending on the exact piping layout, we do have a COL action item that they will provide any additional features to protect that section of piping from --

MR. MICHELSON: Now, the other sections of the fuel pool cooling system, what are the maximum pressures you see?

MR. EHLERT: I'd like to correct something I had mentioned earlier. It's a 10-inch pipe.

MR. MICHELSON: Okay.

MR. EHLERT: Stainless steel, Schedule 40.

MR. MICHELSON: Now, how about the rest? Is it all the same?

MR. EHLERT: It's the same schedule except for the two-inch lines and smaller, which are Schedule 80.

MR. MICHELSON: Okay. So, it's fairly substantial. What's the maximum pressure other than on that leg? Is it all just 100 pounds?

MR. EHLERT: The pressure is 16 kilograms.

MR. MICHELSON: Whatever that is. Tell me the conversion. I think too well in kilograms anymore. I guess it's a factor of 2.2 and it's on 100, so are you talking about 220 pounds? You guys aren't even up on it. Yet, I think that there were supposed to be dual units, but only in, I guess, the SER and not in the SSAR.

MR. POSLUSNY: That's true. GE is in the middle of metricating its --

MR. EHLERT: That's 16 kilograms per centimeter squared, by the way.

MR. MICHELSON: Yes. All right. Then that blows me completely, because I can't do the simple conversion. I've got a conversion table in my briefcase, too. I just was too lazy to pull it out.

MR. EHLERT: We'll get that for you, the conversion number, in a minute, Mr. Michelson.

MR. MICHELSON: But I guess we don't need to worry about ruptures elsewhere in the system. If the check valves were in a failed condition, it would, again, lead to --

there I guess you can -- how does the anti-syphoning device work for this pool when you are draining off the pool from somewhere else? It will work for any reverse flow whatsoever. Is that right?

MR. EHLERT: Yes, it will.

MR. MICHELSON: Okay. So, it's a non-problem. Thank you.

MR. BURTON: The other issue that I wanted to bring up about fuel pool cooling is exactly all of the ways that you can get water to the pool.

In our review -- our review guidelines give the applicant two options in terms of how to design the system. One is to make the whole thing safety-related or to have a non-safety-related system if you have safety-related sources of make-up water and a safety-related ventilation system, and GE has chosen the second option.

Basically, water can be supplied to the fuel pool cooling system from suppression pool clean-up, and actually, there are two connections from suppression pool clean-up to fuel pool cooling. One is via the dryer separator storage pool and the other one via the fuel pool cooling piping, which I show in the diagram. We didn't bring the dryer separator connection up into Tier 1. So, it's not on the diagram that I show, but there are two ways to get water from the suppression pool to the fuel pool.

You can also get make-up water condensate to the pool via the fuel pool cooling skimmers. You can get RHR, which I showed before, and this is the safety-related make-up source that the SRP guidance calls for, and then, when push comes to shove, you can hook up fire water to the system. There is a spool piece that's outside of containment that they can hook up and provide fire water.

For ventilation, under normal conditions, that area is supplied by secondary containment HVAC. During circumstances when that system is isolated, stand-by gas treatment will come on, and that's the safety-related ventilation source that satisfies the second condition in the SRP guidance.

That's all I have on fuel pool cooling, unless there are any other questions.

[No response.]

MR. BURTON: Again, I don't have a slide for the light load handling system. The next thing I wanted to discuss in detail was heavy loads, but for light load, I guess the only thing I wanted to point out was they have defined light versus heavy load, classical definition, fuel assembly, with its handling tool.

The refueling machine is a Type 1, meaning it is single-failure-proof, and as single-failure-proof, it would meet the guidelines of NUREG-0554, although that NUREG was really specifically designed for heavy load handling equipment, but they have made that commitment for the refueling machine.

For heavy loads, again we don't know the exact equipment that the applicant is going to purchase. So, we have a number of design requirements and design commitments, all of which are identified in the SSAR.

In general, they are committing to the guidelines of NUREG-0612, and just briefly, I wanted to say that 0612 provides for safe load paths -- and many of these things are going to be the responsibility of the COL applicant -- to provide safe load paths, provide any necessary protective structures while handling heavy loads, to follow conservative crane design and fabrication practices, conservative crane operation, conservative crane maintenance, inspection, testing, and the other option is to provide a single-failure-proof crane, and for the heavy load handling systems, they have done that with the reactor building crane, and like I said before, they've also committed to making the refueling machine single-failure-proof.

Now, for the devices that are single-failure-proof, follow the guidelines that are in NUREG-0554, and briefly what that says is that you can retain -- the device can retain the load in a safe position if the system or any component in the system fails, provides to have a dual-rope reeving system; we want to make sure that the crane can hold or set down the load while repairs or adjustments are made, and this means either automatically and/or manually to be able to move that load, to set it down, or hold it where it is.

The reeving design has to prevent cutting or crushing of wire rope. Again, chafing and cutting of wire rope is one of the primary means of heavy load failures. So, there are a number of means to -- a number of methods to try and minimize that.

MR. MICHELSON: Now, the reeving is normally referred to the cabling on the drums. How about the cabling on the slings? Do you worry about crushing or cutting them? It's not reeving, it's something else.

MR. BURTON: There are a number of ways that either directly or indirectly affect the wire ropes, you're right.

MR. MICHELSON: That will be a requirement that they also design so they can't crush or cut the slings and not necessarily just the reeving.

MR. BURTON: Right.

MR. MICHELSON: Reeving is the easiest one to fix, because that is very carefully controlled by the drum design.

MR. BURTON: Right.

MR. MICHELSON: It's hard, in fact, to cause that to happen.

MR. BURTON: That's correct.

MR. MICHELSON: But on the sling, it's very easy to have it happen if you aren't careful.

MR. BURTON: That's correct. Part of that is that there is an ANSI standard specifically for slings, and again, they've committed to that ANSI standard.

MR. MICHELSON: What ANSI standard is there for slings?

MR. BURTON: I can tell you that in one second. I think it's ANSI B-30.9.

MR. MICHELSON: What kind of title --

MR. BURTON: Slings.

MR. MICHELSON: Just for slings.

MR. BURTON: Yes.

MR. EHLERT: Yes.

MR. MICHELSON: Okay.

MR. BURTON: The ANSI standard is in the SSAR. There are a number of them, 30.9, 30.2, but I think it's 30.9.

MR. MICHELSON: And that takes care of, then, this aspect of the design and operation.

MR. BURTON: Yes.

MR. MICHELSON: Okay.

MR. BURTON: Okay.

Number five, hoist systems to prevent over-stressing of rope and crane structures. This gets into limit switches to prevent the up-hoisting, limiting the motor torque so that you can't pick up anything that's really too heavy to pick up. Next to problems with wire ropes, over-stressing of both the crane and sometimes the associated structures come up second and third.

MR. MICHELSON: Now, associated with this over-stressing, of course, you have to indicate what the maximum allowable rates of motion are, because that's the stress, then, when you suddenly put on the brakes and stretch the cable out.

MR. BURTON: That's true. Again, going to the ANSI standard, they give very specific requirements about identifying maximum critical load, design rated load, identifying those, requirements on the braking system, a number of things.

MR. MICHELSON: So, that's all covered by the standard that is referenced and, therefore, picked up.

MR. BURTON: Correct.

MR. MICHELSON: Are those ANSI standards written for the steel mill business, as well, or is this a different standard than the steel mills use?

MR. BURTON: It doesn't say that it's specific to any one industry.

MR. MICHELSON: Is it title nuclear somehow?

MR. EHLERT: No, Mr. Michelson. This is Gary Ehlert again at GE. It's the general ASME ANSI standard.

MR. MICHELSON: Okay. So, you don't know whether the steel mill business uses it or not.

MR. EHLERT: Since I am not in the business of constructing steel mills, I don't know what they reference.

MR. MICHELSON: A long time ago, probably well before these standards, the steel mills had a quite different standard than the rest of the industry, because they had a very unique concern, but their concern more closely relates to ours than I think the standard industry, because they're worried about big ladles of molten metals being suddenly lost by cable failures.

MR. BURTON: The only standard that I'm familiar with that is specific to the nuclear industry is ANSI N-14.6, which is special devices for handling --

MR. MICHELSON: At that time, the steel mills were using from a factor of 15 to 20 safety on the stress in the cabling, whereas the reactor business was traditionally using about five.

MR. BURTON: Right.

MR. MICHELSON: This all goes away in a hurry when you suddenly break a load, of course, and you don't have the big allowances that you think you have.

MR. BURTON: What NUREG says that is that -- yes, you're right. We use three times to yield, five times to ultimate, but if you are dependent on one part, basically you have to double those design factors. So, that's what the commitment is.

MR. MICHELSON: Okay. Thank you.

MR. BURTON: Okay.

Number six, failure of automatic controls and limiting devices should not prevent stopping or holding of the load. This is a situation where you may have upper limit switches that may fail, and you want to have features in place that will prevent things like the tube blocking, which would begin to cut and chafe on your wire rope and things like that.

MR. MICHELSON: Some people like radio control instead of pendant control of cranes. Do we prohibit radio control?

MR. BURTON: Right now, we don't prohibit anything. Like I said, much of --

MR. MICHELSON: This could be a radio-controlled crane which, upon receiving the right type of electrical interference, is going to go crazy on you.

MR. BURTON: Well, let me say this. Again, at this point, we have not ruled out any options that are out there in terms of what they want to purchase for their heavy load handling.

MR. MICHELSON: Does anybody presently in the business use radio control for the handling over the core that you're aware of?

MR. BURTON: Not that I know of. Everybody uses pendants.

MR. MICHELSON: I have never heard of anybody wanting to do that. It would be very simple just to make sure that issue is settled. If they use other than pendant control, it's an unreviewed issue and you review it, but it's a tricky business, because in the early days they did want to go to radio control. It's much nicer than a pendant hanging down and all that, but boy it got real interesting. So, I think it's an unreviewed question, but I guess, in the sense of how we do this business, if they want to go to radio control, you don't even review it.

MR. McCRACKEN: Conrad McCracken, NRR. I don't believe there's any way they could go to radio-controlled and still meet all the other requirements for verification of latching, verification of movement, and verification of position. They would have to have a lot of cameras doing a lot of remote-control operations, and I don't think they could do that realistically.

MR. MICHELSON: Depending on how extensive they use the radio control. A lot of times it's just used to move the whole crane back and forth, that sort of thing, and that you can do without every getting into the interlocks of the drum and the other features. There's a real disconnect. Once you get to the motor on the crane, now you can use any kind of motor control you wish.

MR. BURTON: Well, I guess what I want to say at this point is if, for some reason, an applicant who is referencing the ABWR wants to use something like that, we as the staff would have to look at that and see whether or not that was --

MR. MICHELSON: I beg to differ. I think under the licensing of Part 52, you don't have the right to even look at it at this stage of the game.

MR. BURTON: No, that's not true.

MR. MICHELSON: Okay.

MR. BURTON: We have a number of COL action items for a number of reasons, but certainly the intent is that -- the reasons that they are there in this current form is that there is just not enough information for us to really look at it.

MR. MICHELSON: Okay.

MR. BURTON: Okay?

MR. MICHELSON: So, on heavy handling, what is the

C-- -- how does the COL action item read?

MR. BURTON: I can't tell you exactly. If you go to 9-16, there are a number of COL action items.

MS. SILVER: There's about six items.

MR. BURTON: Yes. Basically, what we are saying is that they are going to identify every load handling device, all of the components that that device is to pick up, identify lift points, things like that. It's to identify every aspect of that, so that we can look at it at that point.

MR. MICHELSON: But as long as those aspects meet the SSAR and Tier 1 requirements, they can do it, though, can't they?

MR. BURTON: If those aspects meet the SRP guidance --

MR. MICHELSON: No, I don't think SRP has anything to do with it.

MR. BURTON: I'm sorry. Obviously, I'm not understanding what you're saying.

MR. MICHELSON: I thought that, the first thing, it had to meet the Tier 1 requirements, and then, having met that, you look at the Tier 2 requirements to make sure that those have also been complied with or they've written them off with a 50.59-type change, and that's all you're allowed to do.

MR. WILSON: This is Jerry Wilson.

With regard to items like procedural matters and things like this that Mr. Burton is talking about, where we've deferred the review to the combined license stage, they're reviewed against the current requirements in effect at that time.

MR. MICHELSON: This wouldn't be a starred item?

MR. WILSON: No. It's outside that sphere. It's portions of the review, like other procedures and things like that, that we've deferred to the combined license stage, and Mr. Burton has put reminders in there of the areas that need to be looked at at that stage.

MR. MICHELSON: Right now, radio control is not prohibited by the present Standard Review Plan, is it?

MR. SEALE: Isn't that in the item on page six that says you will have --

MR. MICHELSON: Page six of what?

MR. SEALE: -- of the handout -- that says that conservative crane operation is a COL applicant review item? That comes under operation.

MR. MICHELSON: Yes. No, this is design now, not operation. This is the design. Are they allowed to use radio control in their design?

MR. BURTON: Conservative crane design and fabrication. All of these are the particulars of which are going to have to be provided by the applicant.

MR. MICHELSON: Tell me again, what does a COL action item mean?

MR. WILSON: Jerry Wilson. It's a requirement that has to be met by an applicant for a combined license who references this design. There are certain details of the design that they have to flesh out. In other words, we are not requiring them to provide as-procured information. So, issues that need to be fully resolved when that information is available, that will be done at the combined license stage.

Other issues that we can't review now because they involved the applicant and how he is going to use equipment, that's going to be done at that stage, and so, those issues are deferred until the combined license stage, and then we'll review at that time, under those requirements in effect at that time.

MR. MICHELSON: So, if there was nothing said in the SSAR, then it's still an open item, so to speak, when it comes to the COL action. If radio control had been prohibited by the SSAR and they proposed to use it, then it would also --

MR. WILSON: Then they'd have to come in and seek some sort of change process to get that --

MR. MICHELSON: I thought we were trying to settle these issues all up front, at least in principle, so that we didn't get into all these regulatory arguments later at a COL stage. This would be at least one area where the regulatory arguments come later, after we see what they propose, and if that's the way COL action items are handled, there's hundreds of these that will be later.

MR. WILSON: That's correct.

MR. BURTON: That's true.

MR. MICHELSON: And these aren't even provided for in Part 52, really, not in any straightforward sense. It's just the three-stage licensing we're getting back to real quick. We've gone beyond two-stage licensing. Okay. If that's the way it's going to be done, that's great.

MR. BURTON: We're going to go into water systems now.

MR. MICHELSON: Well, before you do that, I have one question on the strong backs, GE's design of the strong backs for handling the dryer and the separator, which is a part of the heavy load handling. Did you look at the strong back design?

MR. BURTON: Other than the fact that we looked at all of the different devices that are going to be used to carry various heavy loads -- but again, we didn't have a lot of design detail.

MR. MICHELSON: I didn't find a description of the strong back in the sense of exactly how it attaches to the dryer and how it detaches and what this pneumatic -- I knew it had a pneumatic control, I got that much, but I didn't know how the pneumatics worked. I didn't know how the device failed on loss of pneumatics and so forth. Did you look into any of that?

MR. BURTON: No. We don't have that level of detail.

MR. MICHELSON: But that is certainly heavy load handling, and you can't avoid it because you don't have any vessel head anymore to fall on. You now have an open core to fall on. It's very important to know that, after you grab it, it stays grabbed.

MR. EHLERT: This is Gary Ehlert again from GE.

The design requirements for all strong backs is another E-30 ANSI standard, if I remember correctly, that cover strong backs. There's one for slings. There's one for hooks. So, a lot of that is covered.

The exactly design details and how a strong back could be attached to the vessel head or the drywell head is a procurement item, because usually a strong back for the drywell head is supplied by the drywell head manufacturer.

MR. MICHELSON: Now, the pneumatic control, then, is going to be a procurement item.

MR. EHLERT: It will have to be. It's usually part of the strong back itself.

MR. MICHELSON: GE's old strong backs were pneumatically controlled such that it required -- if you lost the pneumatics, the pins would come out of the eyes unless the eyes were loaded.

MR. BEARD: Mr. Michelson, I'm going to take an exception to that statement, because I've worked with those strong backs, and it requires air to move the piston in either direction.

MR. MICHELSON: Well, then what happened at -- I don't remember the name of the plant now -- in which they got the dryers cocked, and as a result, they took the load off of one of the eyes and the pin came out, then, as a consequence --

MR. BEARD: I have no idea.

MR. MICHELSON: -- and they sat there for about three days trying to figure out how to get the dryer out of the --

MR. BEARD: All I can tell you is that the design is such that there is air required to position the pin in either position.

MR. MICHELSON: That's always been the design?

MR. BEARD: That's always been the design on those strong backs.

MR. MICHELSON: I'll go back and check, but that's not my recollection of the early design. On loss of pneumatics, the pin retracts. They did it purposely that way at that time.

So, you require pneumatics in both directions. So, it fails as is. Is that stated somewhere in the SSAR as a design requirement? Because what happens if a guy comes in and does design it like I think you used to design them? What happens then?

MR. BURTON: Well, again -- no, those details are not in the SSAR. What they have made -- and I had put this here -- basically that the crane can -- that the load could be held on a loss of -- system or component failure.

MR. MICHELSON: Okay. So, if you lose the pneumatics, you think that that requirement will say that the pin must stay in place on loss of pneumatics.

MR. BURTON: That the load is going to be held.

MR. MICHELSON: Now, the pin stays in place whether or not the pin is loaded is my point, because the pin may not be loaded.

MR. BURTON: That's true.

MR. MICHELSON: When it's cocked inside the vessel, which is what happened that time the pin became unloaded and darn if it didn't retract.

MR. BURTON: Right. Again, when you go to the standards, they make clear that you cannot assume that there is necessarily a load being lifted or a load being moved when you're looking at all of these protective features.

MR. MICHELSON: Okay. Let me ask it a different way. Is the strong back designed to fail safe?

MR. BURTON: Yes.

MR. MICHELSON: Okay. So, you could argue that "fail safe" means that, if you lose the pneumatics, it certainly should not detach itself from the load, even if the pin weren't loaded at the time, and the reason it wasn't loaded is because it got cocked in the barrel.

MR. BURTON: Yes. The load should be retained.

MR. MICHELSON: Okay. If that's clear enough in the SSAR, then I'm happy.

MR. BURTON: Okay.

MR. MICHELSON: If it isn't clear from the SSAR -- it appears on page 9.1-23. Let's see what it says in the SSAR.

It does say there that the strong back is designed such that one hook pin and one main beam will be capable of carrying the total load so that no single component failure will cause the load to drop or swing uncontrollably out of the essential level attitude. That might take care of it. So, I will retract the question.

MR. BURTON: Okay.

Next is water systems.

MR. WILSON: Excuse me, Butch.

Mr. Chairman, if the Committee is finished with their discussion on fuel storage and handling, this might be a good time for a break.

MR. MICHELSON: Yes. Let me just check and see if I have any other questions.

[Pause.]

MR. MICHELSON: No, I think not. I'll check during the break to see if I have any others. Let's take a break now and come back at 20 after.

[Recess.]

MR. MICHELSON: Why don't we proceed with the next part of your discussion?

MR. BURTON: Okay. Next we're going to go into SSAR Section 9.2, Water Systems. There are a lot of subsections in this section, and it was pointed out to me that some of the things we have here in parentheses may be a little bit confusing. So, let me explain what it was I was trying to show here.

When you go to the SSAR, subsection 9.2.1., 9.2.2, 9.2.3, and some others, it's just very brief, maybe a sentence, no more than a paragraph, because many of the aspects of, for instance, 9.2.1, Station Service Water System, is handled elsewhere in the SSAR, and for instance, for that first one, you'll find that service water system is really addressed in 9.2.15 and 9.2.16, which are Reactor Service Water and Turbine Service Water, but GE tried to arrange the SSAR to coincide with our SRP sections, and as a result of that, you have some -- you know, some things that may not look quite right at first, but that's what I'm trying to explain here. These subsections, the issues may really be addressed elsewhere. So, that's one.

This is number two, where we catch the rest of them. As you can see, we have 16 subsections here.

So, the first -- the way I wanted to approach this was to talk a little bit about interfacing systems. This has come up a little bit earlier today, and I know, back at the draft -- at the draft stage, when you guys were looking at the DSER, this really had not been formulated very well. So, I wanted to take this opportunity to maybe update you and hopefully maybe clarify some questions you may have about it.

Interfacing systems are identified in Part 52, and basically what interfacing systems are are systems or portions of systems that are site-dependent, that we really cannot bring within the ABWR scope. So, those systems or portions of systems are actually out of the ABWR design scope.

Part 52 requires that for those systems that are out of scope or portions that are out of scope that the applicant provide a conceptual design and interface requirements.

Basically, the reason for that -- and Jerry can elaborate on it if I don't get it quite right, but basically we want to know that what they are proposing in the in-scope portion can, in fact, be done, and one of the ways that we do that is to say, okay, well, show us an example of the out-of-scope portion that would mesh with this and see if it all makes sense, and that's what the conceptual design does, and again, the interface requirements are the requirements for the out-of-scope portion that are going to allow a sensible meshing with the in-scope portion.

For the out-of-scope portion, the COL applicant will provide the design details, the actual design details, which we will review, and will also develop any ITAACs that need to go along with that. Those are called COL ITAACs, I take it, right? And again, we'll review all that at the COL stage. So, that's basically the theory of interfacing systems.

Now, in the water systems, we've got --

MR. COSTNER: Question. Bob Costner. 52.47(a)(1)(VII) says interface requirements will be met by those portions of the plant for which the application does not seek certification.

MR. BURTON: Right.

MR. WILSON: This is Jerry Wilson. That's what Mr. Burton referred to as out-of-scope systems.

MR. COSTNER: But the regulation doesn't make the connection between out-of-scope and site-dependent.

MR. WILSON: It does but not at that particular item that you're reading.

MR. COSTNER: Okay.

MR. WILSON: In fact, you have to go to Section 52.47(b), I believe is where it's described.

MR. COSTNER: All I'm getting at is I think it would be in the interest of everybody if you explicitly made that argument in your SER.

MR. WILSON: I'm sorry. Which argument?

MR. COSTNER: That site-dependent and in-scope are synonymous.

MR. MICHELSON: Out-of-scope.

MR. COSTNER: Out-of-scope, yes.

MR. WILSON: Okay.

MR. COSTNER: All I'm saying is, if there should be a challenge down the road, putting that in your SAR could save everybody a lot of grief.

MR. WILSON: We have a write-up in Chapter 1 about that one point. The number escapes me at the moment, but it describes the scope of the design, and it references the SSAR that has a detailed description of what's in and what's out, and I'll take another look at that and make sure --

MR. COSTNER: It simply makes an assertion, I think, in that section you're talking about, and it doesn't present your best case.

MR. WILSON: Okay.

MR. BURTON: All right.

In 9.2, we've got several water systems that are either fully or partially in scope or therefore either fully or partially interfacing systems -- potable and sanitary water, which is partially in, partially out; ultimate heat sink, which is fully out of scope; make-up water preparation, which again is fully out of scope; and reactor and turbine service water, which are both partially out of scope -- and when I say partially, it means that part of the system -- basically, for these that are partially, what we're saying is that part of the system -- this is something that we weren't clear about back at the draft stage -- parts of the system are within buildings which are in scope. So, what we decided to do was that, for those parts of these systems that are within those buildings, those have to be in scope, also, and that's basically what you nave with these three, and the other two are just fully out of scope.

MR. MICHELSON: Let me ask you -- you have, in Section 9.3.8 of the SSAR, a description of the radioactive drain transfer system.

MR. BURTON: Right.

MR. MICHELSON: And that's in scope, I assume.

MR. BURTON: Yes.

MR. MICHELSON: Is there also a non-radioactive drain transfer system?

MR. BURTON: Yes.

MR. MICHELSON: I can't find it described anywhere in the SSAR. Where is it described, and is it in or out of scope?

MR. BURTON: This is one of the big changes from back at the draft stage. The non-radioactive drains are actually part of the potable and sanitary water system, and I'm going to explain that. I'm going to be going into a fair amount of detail on that.

MR. MICHELSON: So, if I go to that system described in the SSAR, I'll find these non-radioactive transfers.

MR. BURTON: Right. Let me go over that. It's just a few more slides.

MR. MICHELSON: Oh, it's coming.

MR. BURTON: Yes, it's coming.

MR. MICHELSON: I thought it might have been past. Thank you.

MR. BURTON: No, no, no. That was one of the big things back at the draft stage that I wanted to talk about now.

MR. MICHELSON: What do you mean? Back at what draft stage?

MR. BURTON: Back when you all were reviewing the Draft SER.

MR. MICHELSON: I've been reviewing the SSAR and I have yet to find it, but I guess if I read the right parts of the SSAR, I would find it. Is that correct?

MR. BURTON: Right.

MR. MICHELSON: Can you tell me what that part that might be?

MR. BURTON: Potable and sanitary water is Section 9.2.4 of the SSAR.

MR. MICHELSON: 9.2.4.

MR. BURTON: And you'll see there very explicitly that non-radioactive drains are part of the potable and sanitary water, but like I said, I'm going to be talking about that in a few minutes.

MR. MICHELSON: Well, just as long as we've talked that much already, are they in or out of scope?

MR. BURTON: Partially in and partially out.

MR. MICHELSON: Okay.

MR. BURTON: Okay.

Now, for the portions of these systems that are in scope, those that deserve Tier 1 treatment are treated in

Tier 1 and are verified by ITAAC, and also, the key interface requirements for -- between the in-scope and out-of-scope portions that deserve Tier 1 treatment are identified in Tier 1, and I'm going to give a couple of examples of that.

MR. MICHELSON: Another question -- you can tell me if you're coming to it and I'll wait, but at various times, in reading descriptions in the SSAR, I find that there's going to be water seals on drain lines. I never find any description on how we're going to keep the water seals filled on drain lines. Is that an in-scope item, and if so, where is it described? It safety-related, because it's the argument that you don't get transfer from one division to another of certain gases or whatever.

MR. BURTON: Right. What you will see is that they make a couple of commitments, that the non-radioactive drains will have no connection with any potentially radioactive system, or if, for some reason, you do have it, you will have a water seal. That's the commitment. They don't get into the details of how.

MR. MICHELSON: They don't tell you how they'll keep the water seal filled?

MR. BURTON: No, they don't go into those kinds of details.

MR. MICHELSON: But I guess it's an implied commitment, if you've got a water seal you'd better have somebody pour water in it daily or have an automatic system to do it or something.

MR. BURTON: Correct.

MR. MICHELSON: Okay.

MR. BURTON: Okay.

The first one I wanted to put up would be an example in the ITAAC -- that didn't come out too well, did it? -- of a system that's fully out of scope. In that situation, you can see that all you have in Tier 1 are the interface requirements. That's all you have. There is no conceptual design. It's fully out of scope. I mean the conceptual design in Tier 1.

What you have primarily are basically the interface requirements, and I wanted to put this up to give you -- just to give you a feel for the kind of issues that we bring up into Tier 1.

We want to make sure, for the ultimate heat sink, that it can provide all the necessary cooling water to remove all the heat that needs to be removed. In this case, ultimate heat sink supplies cooling water to the reactor service water system, which in turn provides cooling water to reactor building cooling water. You know, it's a chain kind of thing.

Again, we want to make sure that we can have adequate make-up water to the ultimate heat sink. We have a requirement or a guideline for 30 days of make-up -- 30 days of operation without make-up, redundant independent divisions, and to the extent -- if there are going to be controls at the remote shut-down panel, we want to verify that those, in fact, are there, and then we also have, you know, its seismic classification.

Issues such as missile protection for the ultimate heat sink, things like that, those are going to be reviewed at the COL stage, but because we don't have a lot of the details about the heat sink, since it is site-dependent, we can't evaluation that right now, and we didn't bring those kinds of issues up into Tier 1.

MR. COSTNER: Bob Costner. In the mechanics of this thing, where do you say it's go to meet Regulatory Guide 1.27?

MR. BURTON: That's part of the Tier 2 treatment when that information comes in. Right now --

MR. COSTNER: Isn't that an interface requirement, also?

MR. BURTON: What we tried to do when we were looking at the interface requirements, we were trying to think, okay, what are the very highest specific issues that we need to verify at Tier 1 to say that, yes, you have built this according to your proposed design and, therefore, we'll let you load fuel, and there were a number of things that we had to -- we couldn't include everything, and specifically, some of the things with 1.27, some of the issues that are in there -- and I guess, right now, I can't think of all of them, but it's not that they're not going to be looked at. It's just that, in terms of the general verification for the ITAAC, we're only going to try and identify, really, the highest level safety-type issues.

MR. WILSON: If I may -- this is Jerry Wilson -- what we're not trying to do in the interface requirements is set forth all the requirements that the design of the ultimate heat sink has to meet but, rather, those requirements that the ultimate heat sink has to perform so the certified design can do what it was stated it would do in the application. So, basic requirements like Reg Guide 1.27 that any ultimate heat sink would have to meet will be done at the combined license review stage.

MR. MICHELSON: On page 9.2-6 of the SSAR, there is an item 5 that says this ultimate heat sink is designed for all the challenges such as tornado, hurricane, flood, etcetera. Is that correct? Is it correct to interpret that as meaning, then, that if we have a site flood, that the ultimate heat sink will not have any of the site flood draining into it? It will be so designed, with berms or whatever, such that the site flood does not get into the ultimate heat sink.

MR. BURTON: Right.

MR. MICHELSON: Is that the correct interpretation?

MR. BURTON: The proper interpretation of that is that whatever ultimate heat sink that an applicant comes up with, during a site flood it is not going to interfere with the operation of that ultimate heat sink to support safety-related equipment. That's the commitment.

MR. WILSON: If I may, there's site parameters that speak to flood levels at the site, and those would have to be met, or they would have to justify something other than that.

MR. MICHELSON: The berm would have to take care of that postulated --

MR. WILSON: As I recall, the site parameter indicates that this equipment would be above the flood level. So, there wouldn't be --

MR. MICHELSON: The site parameter calls for a flood up to, what, one foot below plant grade, something like that? What plant grade means for the ultimate heat sink -- it might be on a hill or maybe down in a valley. I have no idea, but wherever it is, the site flood will not interfere with the ultimate heat sink.

The other question on site floods, will it be permissible to have the site flood enter the pipe chases for the ultimate heat sink, or do we have to keep them water-tight against a site flood?

MR. WILSON: All those requirements we're going to have to review at the combined license stage, but we'll just simply say it will have to meet whatever requirements that are in effect at the time of that review.

MR. MICHELSON: But I could interpret, again, this same item as being designed for the flood to infer that it means keep the flood out of any part of the ultimate heat sink. Is that the way we should read it?

MR. WILSON: Yes.

MR. MICHELSON: Okay. If that's the way it's read, then I have no problem that it's taken care of.

MR. BEARD: Mr. Michelson, to address your question previously, we have a requirement in the revised section on tunnels that will require that there be features to prevent site floods from entering the tunnels.

MR. MICHELSON: Okay. So, the tunnels will be water-tight.

MR. BEARD: I didn't say water-tight, but they will prevent site flood from entering into them.

MR. MICHELSON: Okay. Then you've got to have the -- the rad waste building will have to be tight up to grade, at least, because the water comes from the rad waste building back through the tunnels, through that big opening. That's open at the tunnel, at that end of the tunnel, might be. Maybe it's not.

MR. BEARD: I don't want to get into all of that.

MR. MICHELSON: All right. Okay. But at any rate, I'm interpreting this correctly, no site floods in the tunnels.

MR. BEARD: That's correct.

Now, what Jerry just said -- I think GE's view on that is slightly different. Certainly, when you have a monsoon going on, the water falling from the sky is going to enter into the ultimate heat sink if you're using a spray pond.

What we're trying to say is that, whatever the thing is, you're not going to damage it; i.e., you may have a spill weir that, when the water level in the spray pond gets too high, that you spill the excess off to a controlled dump path.

To say that none of that water flows into the ultimate heat sink I don't think would be GE's interpretation of that.

MR. SEALE: You don't impair the function.

MR. BEARD: That's correct.

MR. MICHELSON: Okay. Good.

MR. BURTON: This next one, I'm jumping from the ultimate heat sink to reactor service water. I wanted to show you how we treat a system that's partially in and partially out at the Tier 1 level.

What we have here is reactor service water, which as you know starts off at a service water pump house somewhere that's out of scope, comes into the control building to serve the reactor building cooling water heat exchanger, and then comes back out. We have three trains of that.

From the point that it enters the control building, this system is in scope and has to be treated as such. For that part of the system that's outside the building -- and the reason it's in scope is because the control building is in scope. For that part of the system that's outside of the building, that is out of scope, and we make that designation here. Inside is RSW system, outside is site-specific scope. So, we don't have -- in Tier 1, we don't have any of the design detail for anything out here, but we do have it here.

MR. MICHELSON: Since it's out of scope, then you can't really do any of the flooding analysis until after the COL holder proposes what he's going to do.

MR. BURTON: That's correct. But we do have an interface requirement. Okay. For instance, specifically for the control building, if you remember from Chapter 3, they did do a flood analysis and had a limiting water level in any of the three divisional rooms in the basement of the control building of five meters. We do have an interface requirement that whatever they design out here is going to have to be consistent with that. Okay?

Next is potable and sanitary water. Okay. Back during the Draft SER stage, when you all were looking at that, this was not in scope at all, and we had some difficulties with that. Since then, we have brought portions in scope, and some are out of scope, but again, just like with what I just showed you with reactor service water, those portions of this system that are within buildings that are in scope are themselves in scope, and the portion of the system that is outside of the in-scope buildings is out of scope. So, we have made that correction.

MR. MICHELSON: Is that same distinction true now of the boiler -- plant boiler system? Because you're using plant boiler water to heat -- heating and ventilating in essential areas. So, you've got to run the piping in. You've got to run the piping into the air-handling units, and so forth.

MR. BURTON: Okay. To tell you the truth, I am not really familiar with that.

MR. MICHELSON: That could be a significant safety problem if one of those tubes busted in the heating and ventilating system and was fed by the boiler. It will just pour lots of water and steam into the building. So, you have to evaluate it.

MR. EHLERT: Mr. Michelson, this is Gary Ehlert again from GE. We're jumping ahead to the HVAC discussion, but in the essential HVAC, the hot water system is no longer used. We're using electric heat.

MR. MICHELSON: Using electric altogether.

MR. EHLERT: Yes.

MR. MICHELSON: Okay.

MR. EHLERT: The only place hot water is used is in non-essential HVAC.

MR. MICHELSON: Now, which non-essential HVAC dc you have in the reactor building?

MR. EHLERT: There is the rib coolers.

MR. MICHELSON: Okay. That's substantial there.

MR. EHLERT: Yes.

MR. MICHELSON: And that can -- it gets into the environment once it gets into that system.

MR. EHLERT: It's hot water. It's not steam.

MR. MICHELSON: It's hot water?

MR. EHLERT: Yes.

MR. MICHELSON: Well, hot water flashes to steam at these pressures. So, you've got steam transfer, not just water in the floor. You've got steam in the building, and where that steam goes to has to be evaluated for safety by, I think, the staff. The staff has to look at any building boiler supplies that go into the reactor building or the control building. You have none in the control building.

MR. EHLERT: That's correct.

MR. MICHELSON: Non-essential.

MR. EHLERT: That's correct.

MR. MICHELSON: The only place you use it, then, is in the reactor.

MR. EHLERT: It's used in the reactor building, and it's used in the turbine building.

MR. MICHELSON: Yes, but you've got some non-essential HVAC in the turbine building that feeds back to the reactor building.

MR. EHLERT: Right. The air supply for secondary containment is heated by the hot water system.

MR. MICHELSON: Yes. And if it busts, it takes the steam right on back into the reactor building in the process, until things are brought under control.

I think the staff has to look at heating and ventilating where hot water is being used and the heating and ventilating gets into essential areas. I don't think it's a big problem, but you may have to have automatic isolation or something or other to make sure it doesn't go on in a prolonged way, and I haven't found any evaluation anywhere of that aspect.

MR. SEALE: That's going to be discussed later.

MR. MICHELSON: Are you going to discuss this later on?

MR. BURTON: I'm sorry. What was that?

MR. SEALE: HVAC is a later item on the agenda, isn't it?

MR. EHLERT: It's a later item for the staff's agenda, yes, 9.4.

MR. MICHELSON: So, we'll hear about it then. Okay.

MR. BURTON: Okay. Once we decided that there were parts of this system that were in scope, then we had to talk about that and describe it and define it. Basically, potable and sanitary water is made up of three subsystems.

There is a potable water subsystem, which is basically the water supply, and the water to this subsystem is actually supplied from make-up water preparation, which is one of those systems I told you before was totally out of scope, but it supplies the water to this system.

The second subsystem is the sanitary drainage subsystem, okay? This is where we start to get into the non-radioactive drains which you had asked about before, and again, it collects and transfers waste to the next subsystem, which is the sewage treatment subsystem, and here it chemically treats the sanitary waste and it's sampled and then discharged.

Now, in terms of review guidance, as we said before, the key thing is that you want to make sure that that non-radioactive drain system cannot receive water from potentially radioactive systems, and we do have that -- that is addressed in the SSAR, and we've evaluated that, and like I said, they have made the commitment that there will be no interconnections, or if, for some reason, there were, they would use the water seal, and we don't have the details about how they're going to maintain the seal, but they have committed to it, and that's pretty much what I have on potable and sanitary water.

The next one -- and this was another big one -- was HVAC emergency cooling water or the emergency chillers.

First of all, just a brief description, it is a safety-related system, and it serves to provide chilled water to three specific areas: the reactor building, safety-related electrical equipment -- HVAC system -- there are a number of HVAC systems, but this is one of them -- the control room habitability area HVAC system, and the control building safety-related equipment area HVAC system. There are two separate HVAC systems that serve areas in the control building, and the chillers provide the chilled water to all that.

Now, back at the draft stage, an issue came up about the chillers and their ability to perform their functions specifically during a station blackout, and GE has provided information and we've looked at it, and basically what we're saying is that, on a station blackout, the emergency chilled water is lost until the alternate AC is available, and that's the combustion turbine generator. As you know, that alternate AC source can be hooked up to any bus, whether it's safety or non-safety-related, and they can do that within 10 minutes.

Now, back during the draft stage, what Mr. Michelson had pointed out what that, normally -- and this was the assumption -- if you had a loss of power, you can't assume that, as soon as you get the power back, the chiller is available. It takes a while to crank these things up. So, that was the issue back then.

Now, what we did was we went and talked to some people who were familiar with chiller operation, and they said, as a practical matter, it takes about -- assuming power is available to the chillers, it takes about 15 minutes to really get them up and running.

So, you could postulate that, even once you get the alternate AC available, there's another 15 minutes before you get the chillers up and running, for a total of

25 minutes, almost a half-an-hour, but what's postulated is that what you do have as soon as alternate AC is available is you get your HVAC systems back.

So, even though you may not be getting your chilled water available, you are getting some air flow through those rooms, which is going to help to alleviate whatever temperature increase there may be that may have occurred during those first 10 minutes.

MR. MICHELSON: Now that we have the revelation that, indeed, you can't restart chillers immediately on tripping, what are you doing about the automatic diesel loading? In case the diesel trips out on startup, you go back and reload again with your automatic sequence. Are these in the automatic sequence?

MR. BURTON: Okay.

MR. MICHELSON: Because clearly that comes within a minute or so.

MR. BURTON: Right. I am not the person who can really talk extensively about this.

MR. MICHELSON: Well, somebody on the staff should look into this. If you believe that it takes 15 minutes before these things can be restarted, then you have to ask how about automatic restarting? Is it even permissible to try to do automatic restarting?

MR. POWER: This is John Power from GE. There is an awful lot of mixing oranges, apples, and even a tomato is getting in there now.

We're addressing in some of these things station blackout, and there is a RCIC system on this plant that takes care of everything for quite a while, that's automatic. We have a CTG that can power not only safety-related systems but non-safety-related equipment protection systems, okay?

We have a case here where someone feels a need for chillers in certain systems in a very short period of time. If you remember the design basis of a lot of those electrical rooms, the rooms that were dependent on electronics for control and such, they don't really need cooling for that period of time in any way, shape, or form. They have no loads on them.

There are some power generation load sources that we do have -- we want to restore cooling to them in a short period of time, and so, that's one set of rules, the SPO case.

Now, if you're talking about the case of normal loss-of-coolant accident, diesel generator starting and loading, then again you also have another set of conditions and things to address here, and I think maybe your last concern is relative to that -- loading the diesels, putting the chillers back on, and having some period of time before they're effective.

We talked to you about the chiller system having microprocessors, having electronic devices on them for pre-loading and post-loading, having stand-by sources available to be powered that weren't pressurized or weren't running.

There's a lot of pathways to discussion that are not on the board here, and we've evaluated the ability to restart other chillers that weren't running in a period of time in order to restore environmental conditions that would keep us under the qualifications of that equipment.

As we talked about in our answers to the question before, they're going to be automated, we're going to have microprocessors that are going to make the determination of which ones can be loaded and not loaded, which ones can be de-gassed and not de-gassed.

That happens to be a component-level question, and we've been, I guess, being constantly questioned on it, but we don't want to preclude the use of a valuable cooler simply because we make a commitment in the SSAR that we're going to automatically put them on immediately.

MR. MICHELSON: Well, it appears that the commitment was made to automatically load them. Maybe I'm incorrect. When you have a LOCA, is the cooler in the diesel start logic? That's the first question.

MR. BEARD: The loader on this does not use a load sequencer, unlike other designs.

MR. MICHELSON: Yes.

MR. BEARD: Each component that loads looks at bus voltage and then starts its own timer. So, in this case, it would reconnect and have power available, and the microprocessor then would go through its start-up cycle.

MR. MICHELSON: But it certainly has to have one further element of logic then and ask, well, what else is wanting to start at the same point, so we don't start two together.

MR. BEARD: Well, again, I'd want to re-verify this, but I believe the HECW chillers are the last block to go on.

MR. MICHELSON: The last time I looked at it, they were near the end, right.

MR. BEARD: And these are 480-volt chillers.

MR. MICHELSON: And the concern is, of course, you don't want to start them if they've just been running, because I think you will end up with a very large in-rush, and it won't kick out, and you might even kick out the diesel in the process. That's the point. Can you load the pressurized compressor onto the system without kicking out the diesel, particularly if it's the last load.

MR. BEARD: These microprocessors, you know, they have clutches that they control on these things and we've got load dumps and everything else. They're not going to try and load in when the thing is still pressurized. They'll dump the pressure and then they'll start up again.

MR. MICHELSON: Okay. This is all described where?

MR. POWER: Well, I think it's scattered throughout the book. We've answered questions about the chillers before and about the microprocessors, and I think we've put those on record. As Alan said, we've talked about the normal LOCA loadings relative to the timing. We've talked about station blackout. We have a whole section on station blackout in an appendix in Chapter 1 which goes over a lot of this.

MR. MICHELSON: I know we've got lots of answers. We're getting so many answers now, in fact, it's hard to keep to track of all of them.

MR. POWER: Right.

MR. MICHELSON: But the thing I would look for when I go to read your answer is I will expect to -- I think you still have it as automatic loading, but I will expect, then, to find a discussion that indicates under what circumstances it would not go back into the diesel loading logic or a discussion that says, even if it goes in fully pressurized, here is the in-rush here is why the diesel doesn't trip out.

I'd expect to find an answer to all of those questions that would satisfy me then that you're not going to kick out the diesels, because it's going to happen to maybe all three diesels at the same time. They all get the signal to start together, and they all get that signal for the compressors about the same time. You may lose all the diesels if they can't handle it. So, I expect a discussion of why it's a non-problem, and I will look forward and expect to see it if you say it's there, or we'll give you call and you can tell me where else to read that I might not have read.

MR. COSTNER: Bob Costner.

The next-to-the-last item on the 10-minute curve -- it's possible you've gotten a commitment from GE, but the appendix that was referred to just a moment ago on station blackout, under plant HVAC restoration capability, it says the normal control room environment will not exceed its design basis temperature even during a prolonged SBO. It doesn't make the claim for the other two areas. It doesn't make that claim for the reactor building safety-related equipment room or the control building safety-related equipment area.

MR. BURTON: Okay. Unfortunately, you would need someone who knows the details of the SBO and HVAC, and I'm not either one of those.

MR. MICHELSON: Could we somehow get an answer from whoever does have the answer?

MR. POSLUSNY: We can capture things we don't get today tomorrow. We'll bring people -- we'll bring SBO --

MR. MICHELSON: We'll bring this question up again at full Committee, then, I guess is when you're proposing to answer.

MR. POSLUSNY: No, tomorrow.

MR. MICHELSON: Oh, you're going to bring them tomorrow.

MR. POSLUSNY: Yes.

MR. MICHELSON: Oh, that's better yet. That's better yet. Okay.

Now, one other question related to the SBO which GE could probably give me a quick answer to, if we have an SBO and we start up -- I don't think you're proposing to run all chillers off the -- you're just going to run what you need.

Now, do we have any concern that the chillers that aren't being run, which also means their oil is no longer being heated, because we aren't putting any power to those chillers -- are we going to be able to have those chillers available after the SBO, which is, I guess, an eight-hour maximum duration? Are those chillers still going to be operable without draining the oil and -- or going through a

12-hour heat-up or whatever, or are we just running along on the same chillers that we were running along during the SBO? Even though we want to start other equipment now, it will increase our heat loads and call for more chillers.

MR. POWER: We have a relatively large CTG. We have reserved places on there for one safety bus. If you look at the events that we're talking about, we're only going to be using part of those loads on that particular bus for safe shutdown. In fact, we're maybe even continuing around, we're simply charging the battery and we're going out there for quite a while, okay?

MR. MICHELSON: Okay.

MR. POWER: We're then going to go into shutdown cooling and cold shutdown with an RHR system. So, we have a lot of power available from that machine to serve a lot of equipment protection loads, and those loads may include maybe all of those particular chillers.

MR. MICHELSON: The heaters are no big load. It's trivial.

MR. POWER: Right.

MR. MICHELSON: It's just a matter of making sure that they're on.

MR. POWER: Right. Like I said, we only need -- we have the capability of powering something like seven ECCS pumps, and we're only going to use one. So, we have a lot of reserve power to go to other equipment protection, such as HVAC.

MR. MICHELSON: I guess it's -- the hope is, of course, that these things are picked up by the COL applicant. They're not in the SSAR.

MR. POWER: Yes. In fact, there is a requirement that we develop a procedure relative to loading chillers back onto the system and other things as part of the COL commitment.

MR. MICHELSON: Okay. Hopefully this item won't get lost between now and 10 years from now.

MR. BURTON: Actually, it shouldn't get lost. I mean this is documented in the COL license information section in the SSAR.

MR. MICHELSON: Which is documented?

MR. BURTON: This last one, what the COL has to do regarding the --

MR. MICHELSON: Is the fact that you've got to keep those chillers hot documented?

MR. BURTON: Not to that specificity. What it says is that they will provide, you know, whatever necessary procedures to make sure that they can do that, and that would fall under that.

That's all I have on that one. Oh, I did want to mention -- I know that, Mr. Michelson, you would like to see us have more expertise in the inner workings of chillers and things like that as part of our review, which our current SRP doesn't give us.

MR. MICHELSON: You don't have an SRP for chillers. So, we can't talk about your current one. You don't have one. Let's be factual about it now.

MR. BURTON: All right. Agreed. You have expressed concern about that on numerous occasions. You know that we are in the process of upgrading the SRPs, and although we are not responsible for that, we have passed that along to the responsible people.

MR. MICHELSON: Is someone actually writing a section of the SRP for chillers now? I never heard the staff even really declare that was being written.

MR. BURTON: Unfortunately, I can't give you the details of that, because none of us are involved with that, but all I can tell you now is that we passed that along to the people who are organizing that upgrade, and I assume, at some point, you all will be looking at that.

MR. MICHELSON: We'll ask again someday. Someday somebody will ask.

MR. POWER: Our understanding is, from the outside, that Batelle Northwest has a contract relative to looking at upgrading SRPs relative to advanced reactor designs.

MR. MICHELSON: Yes. I've seen some of their product. It didn't seem to have anything to do with a new SRP as such, but it could eventually perhaps.

MR. BURTON: Okay. Now we're into Section 9.3, which is Process Auxiliaries.

MR. MICHELSON: Before we get into that, let me ask a simple-minded question.

MR. BURTON: Okay.

MR. MICHELSON: Every once in a while in the SSAR, I find the word "electrical building," but when I look at the building layout you gave us, right off the top, I don't find an item identified as electrical building. I think I know what it is. I think it's the turbine building, electrical portion, but I don't know that, and why are we referring to electrical building areas when there isn't one? Maybe the Japanese have an electrical building.

MR. EHLERT: The control instrumentation people have basically been calling the bay on the east side of the turbine building, which would be the top of the page as you look at it, that runs along the top of the building, which controls the boiler, the CTG, and some switchgear -- and I believe there's some other stuff there --

MR. MICHELSON: HVAC is in there, also.

MR. EHLERT: -- I think there's some HVAC in there, also; it's basically a clean area --

MR. MICHELSON: Yes.

MR. EHLERT: -- as the electrical building.

MR. MICHELSON: But sometime -- you know, is it the turbine building or the electrical building?

MR. EHLERT: It's integral with the turbine building. So, it's considered part of the turbine building.

MR. MICHELSON: Yes. Therefore, we shouldn't be using the nomenclature of "electrical building," because there isn't an electrical building. It took me a long time to finally decide that there wasn't one, but the SSAR still uses that terminology. I don't know if the staff ever picked up on that or not. There is no electrical building.

MR. BURTON: Right. Well, when we get into the HVAC systems, there is a specific HVAC subsystem in the turbine building called the electrical building ventilation system or something like that.

MR. MICHELSON: Yes. Then I ask where is the electrical building?

MR. BURTON: Right. It is, in fact, what you said. It's the portion of the turbine building that has many of the electrical components in it.

MR. MICHELSON: Maybe the Japanese have an electrical building, but this plant doesn't, as far as I know. I at first thought it was the switchyard control building, that that was what they were calling the electrical building, then I finally realized, by deduction, what it had to be. We shouldn't be perpetuating nomenclatures that are really not correct.

MR. BURTON: We're going to go process auxiliaries, and I need to make a couple of comments here.

Section 9.3 -- up until now, all the sections in 9.1 and 9.2 fell under the responsibility of the Plant Systems Branch. Not every section in 9.3 is ours, but I don't think that any of the branches that have responsibility for those other sections are going to be giving presentations. I think what's going to happen instead is that, if you have any questions in any of those subsections, people should be available to answer them, but I don't think there's going to be a specific presentation on them.

Now, when we list all the process auxiliaries, you see that, right there in the middle, is a Chapter 6 subsection, and I need to explain that a little bit.

Again, GE tried to follow the same format as the SRPs. So, in fact, subsection 9.3.1, which is compressed -- I say compressed air, but it's really compressed gas. In fact, that has been broken out into three other subsections: 6.7, which is high-pressure nitrogen, instrument air, and service air.

So, that's why I have the "NA" here, why I make this notation. It's actually these three. All three of these are actually reviewed to the guidelines of SRP Section 9.3.1, compressed gas, and then, following that, we also have 9.3.3, the non-radioactive drains, which we already spoke about before, that are actually part of the potable and sanitary water system.

MR. MICHELSON: Now, where do I read about that? That would be in Chapter 9, then, under sanitary and potable?

MR. BURTON: It's either 9.2.4 or 9.3.3, and I can't remember off the top of my head which section those things are really discussed.

MR. MICHELSON: That's where potable and sanitary water is.

MR. BURTON: Right.

MR. MICHELSON: Now, you're saying, under that, I will find this non-radioactive drain system?

MR. BURTON: I don't think you'll see it as a subheading.

MR. MICHELSON: Where will I read about it then?

MR. BURTON: Well, there's really not much to read about. Most of the design details for the non-radioactive drains are going to be supplied by the COL applicant.

MR. MICHELSON: Well, there's certainly got to be some interface requirements to keep events occurring out in the tunnels and whatever from getting back into the reactor building.

MR. BURTON: Right.

MR. MICHELSON: You know, busted pipes or whatever, to keep back-flow from occurring.

MR. BURTON: Right. Like I said, I don't know exactly which section it's in, but it's in there. The two concerns were making sure that potentially radioactive water can't enter those drains -- that was one.

MR. MICHELSON: Maybe by tomorrow you can come back and tell me what section to read.

MR. BURTON: I can show to you at the next break.

Then the other issue had to do with back-flow protection, and basically, what we're saying is that, even though -- and this applies to radioactive and non-radioactive. The drains ultimately all drain to some kind of collection tank, but from there, they are pretty much separated, but the issue obviously is that --

MR. MICHELSON: The drains drain to a sump.

MR. BURTON: I'm sorry. Yes. For the --

MR. MICHELSON: Then they're sumped from the sump to a collection tank in the rad waste building.

MR. BURTON: Right. And through the sump to the collection tank, everything is separate.

MR. MICHELSON: You mean each sump has its own dedicated pipe to the rad waste building.

MR. BURTON: For radioactive drains, that's --

MR. MICHELSON: For radioactive drains. I don't find that requirement anywhere. Is there a requirement? Does GE agree that there are dedicated pipes for each one of those sumps?

MR. BURTON: Okay. We're jumping a little bit ahead.

Basically, there are separate sumps in each division, okay? Those ultimately all go to collection tanks, whether it's high-conductivity waste, low-conductivity waste, hot shower drains, that kind of thing. At some point, they all meet up.

MR. MICHELSON: Well, there's two sets of sumps to begin with. There's a hot sump and a cold sump, I assume, in the reactor building.

MR. BURTON: They don't use those terms.

MR. MICHELSON: You run your floor drains to one sump?

MR. BURTON: Yes, you have floor drains and equipment drains, if that's what you mean. You mean floor drains and equipment drains.

MR. MICHELSON: Yes.

MR. BURTON: Yes, they do have that.

MR. MICHELSON: So, there's two sets of sumps.

MR. BURTON: And there are two sets of sumps.

MR. MICHELSON: And now the question is how are those piped back to the rad waste building?

MR. BURTON: Right. Those are piped separately to collection -- again, high-conductivity waste and low -- low-conductivity waste handles the equipment drains.

MR. MICHELSON: Yes.

MR. BURTON: High-conductivity waste handles the floor drains.

MR. MICHELSON: When you say they're piped separately, does that mean there is a pipe from the sump pump directly back to the rad waste building and it doesn't tie in with any of the other sump pumps?

MR. BURTON: Yes. They don't meet up until you get to the collection tank.

MR. MICHELSON: Okay. Does GE agree that's the way it's done?

MR. BURTON: What you're going to need to do -- there is a P&ID -- the radioactive drains are part of the Chapter 11 P&IDs, okay?

MR. MICHELSON: Chapter 11 P&IDs.

MR. BURTON: Perhaps I am wrong, but I seem to recall -- and we've had some problems with those P&IDs on whether they were going to be in or out and that kind of thing, but certainly the last ones I saw, I believe they were separate until they got to the collection tank. Correct me if I'm wrong. Correct me if I'm wrong.

MR. BEARD: My remembrance -- and I'll have to verify it -- is that we do allow them to header up once they get out into the rad waste tunnel, and we have back-flow protection only.

MR. MICHELSON: I haven't found a P&ID that shows how many are headered and what kind of valving there is to prevent back-flow and so forth. Is there a P&ID that describes this?

MR. BEARD: I need to find out which it is. There was one, and it was proprietary, and we asked them to make it non-proprietary, and I haven't looked at it since.

MR. MICHELSON: I sensed that it was going to be headered, and I couldn't find the details on what things were headered together, everything from the reactor building into one point, one for each division.

MR. BEARD: But the separation we do have is that we're maintaining separation between high-conductivity waste and low-conductivity waste and any other sump classification that we're pumping back into the collection tanks in the rad waste building.

MR. MICHELSON: Let me ask my question again differently. Is there a separate pipe for the Division 1 sump, another pipe for Division 2, and a third one for

Division 3?

MR. BEARD: No. The three high-conductivity pumps would be --

MR. MICHELSON: Headered together.

MR. BEARD: -- headered together out in the rad waste tunnel.

MR. MICHELSON: It becomes a common connector, potentially, to all three divisions if something goes wrong.

MR. BEARD: There's a back-flow check valve on each pipe.

MR. MICHELSON: Yes, but is it under the ISI and so forth?

MR. BURTON: Yes.

MR. MICHELSON: How do you know?

MR. BURTON: Because it's there. As I said --

MR. MICHELSON: You first of all described a system that doesn't even necessarily exist, and I'm wondering if you looked at what GE really has.

MR. BURTON: Right.

MR. MICHELSON: Before you answer, I think you'd better go back and look, and then we can discuss tomorrow what the right answer is.

MR. BURTON: Okay.

MR. POWER: You're concerned about back-flow from one sump to another sump. There's a couple of items that are in there.

First of all, there's this connection back-flow protection. Secondly, at each sump, there is also a check valve, and if that check valve were to fail and you were to pull water from one sump to the next, the next sump then picks up and recognizes it's got water and starts pumping the water out.

MR. MICHELSON: Let me give you the model. The model is that we have flooded one division --

MR. POWER: Yes.

MR. MICHELSON: -- by some other non-related event --

MR. POWER: Yes.

MR. MICHELSON: -- and now we've got water 10 feet deep in the division. We don't want that water to get into the other two divisions --

MR. POWER: I understand.

MR. MICHELSON: -- and we want to make sure no back-flow can occur through the common pumps.

MR. POWER: Right.

MR. MICHELSON: I don't know at what elevation the piping is, whether it's down -- see, that tunnel is very deep. In fact, right now, you've put it down at the basement slab level of the reactor building, and it's only probably a 8- or 10-foot-high tunnel. So, the elevation of that tunnel becomes very critical relative to the fact that you can go up to, I think, about 12 feet or so in any one division from the suppression pool drainage into the division --

MR. POWER: Yes.

MR. MICHELSON: -- and so I want to know that that water doesn't just get right on back if the check valve doesn't work on the other division.

MR. POWER: Okay.

MR. MICHELSON: A single failure, in other words, could flood two divisions then.

MR. POWER: Yes. The individual sump diagrams were in 12, and they're very complete with the check valve coming back. Now, the second check valve -- once they header and go back -- that check valve I don't believe is shown on the diagram.

MR. MICHELSON: I couldn't find one, but you'll help me, but I think that has to be very carefully described, and the staff has to decide whether it's an acceptable arrangement, with single failure -- for the case where we've flooded one of these divisions from the suppression pool getting into the division, and we've already postulated that, and we've said what the elevation will be, and we've said it doesn't affect the other divisions, and that would be a true statement only if the sump pumps aren't interconnected in a single-failure-proof arrangement.

MR. BURTON: High-pressure nitrogen -- this was evaluation in SER subsection 9.3.1, which covers all compressed gas systems.

System description: What it does is provides the operating fluid for the safety relief valves, including those for the ADS. It also serves some non-safety-related users inside containment. The system itself is separated into two safety-related divisions and one non-safety division.

In general, the review guide has asked for compliance with this ANSI standard, which it does with one exception, and that has to do with the maximum particle size.

The ANSI guidance asks for a maximum of 3 microns for the particle size. The ABWR is committing to a 5-micron. We bought off on that with the added condition that any equipment that's going to be served by this system is also going to be able to handle that maximum particulate size.

The non-safety-related division is everything within these motor-operated valves along this line. It's normally supplied from the atmospheric control system, which supplies -- has nitrogen -- I guess it's liquid and then it vaporizes and supplies basically the users inside containment.

As a back-up to that, what we have are two banks of nitrogen bottles, which are supplied here. These valves are normally shut. These valves are normally open.

What you can see, on each line we have a pressure sensor, and what happens is that, if for some reason -- as I said, this is the normal supply. If it senses a low pressure here, these valves will shut, and these valves will open to supply the users from the bottled source.

Again, if there is a sensed low pressure on either of the safety-related divisions -- for instance, if you get a low pressure here, again this valve will shut, this valve will open to supply the nitrogen from the bottles.

All that's verified in ITAAC, and basically, that's how the system works, and that's pretty much all I have for the high-pressure nitrogen.

I brought this up because, at the Draft SER stage, there were still some questions on exactly how the system operates. So, that's why I wanted to bring it up today.

The next one -- I basically complied instrument and service air, because they're pretty much similar in terms of what we have to look at.

Both systems are non-safety. Both, again, have to comply with the same ANSI standard that I talked about before, and so, the same issue with the particulate size came up, and the same conditions are there.

Back at the draft stage, I think there was -- at one point, there was a question as to whether or not instrument air backs up high-pressure nitrogen, and even though I don't have it up here, we clarified that, in fact, it does, and that's clarified in both the SSAR and the SER.

Non-radioactive drains -- we've already talked about that quite a bit. It's actually considered part of the potable and sanitary water system, specifically the sanitary drainage subsystem.

Some portions of the system are out of scope, as I said before. Basically, there should be no interconnections to potentially contaminated systems, and despite that, we do -- they are going to sample the effluent before it's discharged.

MR. MICHELSON: Have you covered the air system, the non-essential air system yet?

MR. BURTON: Oh, okay. If you want to go back to --

MR. MICHELSON: I need to go back to it, I guess.

I had left some questions, I thought, for the staff concerning this compressor room out in the turbine building which is below grade, and the fact is it houses all the air compressors for the plant, as near as I can tell, and it's flooded by the site flood, because the site flood goes up to grade.

Now, when that becomes flooded, then all the air compressors in the plant and all the dryers and so forth are lost. How critical is that going to be to continued plant safety, first of all, and then, secondly, to plant recovery?

MR. BURTON: Okay. Basically, normally instrument air -- let me show you a different slide.

MR. MICHELSON: You've got some tie-ins between this instrument air and this nitrogen system and so forth --

MR. BURTON: Right.

MR. MICHELSON: -- and I began to wonder what happens on all this during a site flood if I lose all those compressors, besides fill the rooms with water.

MR. BURTON: It's a little bit complicated. Let me try and explain some of this. This isn't in your package.

Again, here is the atmosphere control system that provides normal nitrogen. Here are the safety-related nitrogen bottles that serve as back-up. Here is instrument air, which serves as a back-up to high-pressure nitrogen. The interface is right here, but --

MR. MICHELSON: That's normally isolated then.

MR. BURTON: Right, normally isolated.

MR. MICHELSON: Okay.

MR. BURTON: Okay? If for some reason that you needed to use instrument air, basically it comes in here, serves for the MSIVs. That's it. Okay?

So, if you -- to lose instrument air, in and of itself -- I mean if high-pressure nitrogen -- I mean if you're still -- if you still have your nitrogen --

MR. MICHELSON: As long as the nitrogen lasts, you have no problem.

MR. BURTON: Right.

MR. MICHELSON: And of course, you're shut down. So, I guess the MSIVs are closed.

MR. BURTON: Right.

MR. MICHELSON: That's the only use of it.

MR. BURTON: Pretty much.

MR. MICHELSON: How about heating and ventilating control within containment or elsewhere?

MR. BURTON: Again, HVAC --

MR. MICHELSON: Again, I'm talking HVAC with GE. I'm not sure --

MR. POWER: You asked that question and we responded to that, I think, about three meetings ago.

We went through and did a failure modes effects review of what would the loss of air be relative to the plant, and there were a number of components that -- where there were -- like the reactor building closed cooling water system which, upon loss of air or depletion of air, does close non-safety portions off, okay?

There were a couple of other small valves closed but nothing in the sense of isolating ventilation airs. They were done in the control room electrically and not pneumatically.

MR. MICHELSON: Wait a minute now. The heating and ventilating controls on the --

MR. POWER: In the control room itself.

MR. MICHELSON: No, no, no. The heating and ventilating out in the building where the pumps are, is that going to be pneumatic control dampers, or is that going to be electric?

MR. POWER: You're talking the turbine building or the reactor building?

MR. MICHELSON: The reactor building.

MR. POWER: Reactor building-wise, there was some air applied to the normal ventilation, normal ventilation system. Upon loss of that ventilation system, we would go to the coolers that are in the important safe shutdown equipment, which are independent on that system, and the loss of air on that system would not inhibit their operation.

MR. MICHELSON: There's no pneumatic control on the coolers.

MR. POWER: That's right.

We went and looked at a number of other systems, and there were some other auxiliary systems that were using air to isolate from non-safety portions to safety portions.

Then we did an evaluation, if we had dirty air relative to those systems and the valves stayed open, and again, we find that most of these valves were also closed by two other sources in addition to air. They were spring-loaded in some cases. The loss of electrical power or the trip signal would close them.

MR. MICHELSON: The key question here, though, is do we have to have air to safety survive the site flood, which I guess is 30 days or -- I don't know what a safe flood is, but clearly it's going to be well over 30 days, probably, to get the building drained again and get those compressors all back in operation, because every air compressor apparently is in that one room.

MR. BEARD: Alan Beard, GE. Two responses to that.

Number one, neither the service or instrument air are classified as safety-related.

The second thing is site flood doesn't get into this room.

MR. MICHELSON: Why not?

MR. BEARD: We have categorically stated that a site flood can't enter these buildings, because all entrances are above site flood stage.

MR. MICHELSON: No. The entrance to this room, which is below grade in the turbine building, is not protected.

MR. BEARD: The entrance to that room comes from the service building.

MR. MICHELSON: Yes, at elevation 5,300.

MR. BEARD: From the service building.

MR. MICHELSON: Yes, but what's keeping the water out of the service building?

MR. BEARD: The seals on the connecting passageway.

MR. MICHELSON: The service building is not watertight during the site flood. I think you can see that you'll flood the service building, the turbine building, but you won't flood the reactor control building. So, I don't think you've demonstrated that you keep the water out of the compressor building unless it's above grade, which it's not.

MR. BEARD: Okay. Then I'll just back off and say that the stuff is non-safety-related and it's not required. We have --

MR. MICHELSON: I knew that. My only question was has the staff looked at this in view of the site flood not being a short-term but, rather, a long-term effect? Cooling water and loss of all compressors will take time to recover from and so forth. I think we're talking maybe one to two months without any air. Is that acceptable?

MR. POWER: Again, like we said, that analysis we looked at was safe, orderly, cold shutdown.

MR. MICHELSON: Yes.

MR. POWER: And therefore -- we even -- you could even look at those same sources and wonder whether or not you needed to restore cooling water to non-safety-related systems, and I'm quite sure you could go out there and do that without air by opening those valves in some manner, but the ones that we were talking about for safe, orderly shutdown and the ones to maintain shutdown, such as relief valves or any other things, they're off nitrogen systems, which are both tankage and bottle.

MR. MICHELSON: I think I just -- I presented a postulation and I asked the staff if they've looked at it. If they haven't, is it something they should look at? And it's not related to the short-term LOCA. I have no question about the ability to ride through a LOCA without the building compressors.

I wondered, though, about a 30-to-60-day duration of safe shutdown. Can that be maintained without compressed air, instrument air, whatever? Instrument air and compressed air are both in the same room.

MR. BURTON: I think the answer is yes.

Let me go back to when I spoke about Chapter 3 and the flooding.

In the turbine building, there are really two primary flooding sources. One is circ water and one is turbine service water. Okay?

Turbine service water is bounded by the circ water, and what we have is, in the condenser pit, we have some level sensors, and what they do is, on high-level sense there, they will trip off circ water pumps and basically trip off and isolate that system.

Turbine service water being a smaller system, as a result of the flood analysis, the water starts filling up at a slow enough rate that we can actually terminate the flood with operator action. Circ water is so big and things happen so fast, you need to have an automatic isolation.

So, we have looked at it from that perspective, but the bottom line is that, even if, for some reason, all those protective measures failed, it would flood up to the surface level, go out basically the big truck doors, and just spill out onto the site, and yes, in a situation like that, you could possibly lose your instrument air compressors, okay?

But as I said before, that is not an issue unless somehow, at the same time, you had lost your high-pressure nitrogen.

MR. MICHELSON: Well, it is an issue in terms of your site flood analysis.

You certainly have to consider in that analysis the consequence of loss of compressed air for any duration, and if you're telling me they can go forever without the compressed air, then it's a non-problem.

If you can't go forever, then at what point must you have restored the air, and at that point, is it credible that the site flood has gone away, you've de-watered the buildings, you've got all this equipment back in operation in whatever that duration is?

I think the answer -- I just don't think you've looked at it, unless you can tell me you have, and I'll go read the study.

MR. BURTON: I can't say that we've looked at it to that level of detail. What we've looked at --

MR. MICHELSON: This is not a great level of detail. This is just a site flood, and you've already told me it floods the building.

MR. BURTON: I'm saying it floods the building if the other -- if the isolation fails.

MR. MICHELSON: A site flood is not isolable, a site flood now. This is a site flood, not a condenser circulating water failure.

It's a site flood, and you can't isolate it, but you're designing for it. I'm convinced you're designing for it. I've read a lot of good words about it, but I didn't read in the flood analysis any consideration of loss of instrument air for a long duration.

So, I gave Medhat the question ahead of time for you fellows to come prepared to discuss it, and I guess you conveyed it to them.

MR. EL-ZEFTAWY: Well, yes, for the site flood.

MR. MICHELSON: Yes. And the site flood is the only thing we're talking about.

MR. BURTON: Okay.

MR. MICHELSON: And I'm asking, does the site flood analysis account for this very prolonged loss of all compressed air for instruments, as well as for the other uses?

Now, I think maybe tomorrow you could come back and tell me either you've looked at it and got an answer or you're going to look at it or you don't think it's important, one of the three.

MR. BURTON: Okay.

MR. MICHELSON: If it's not important, then we have to make a suggestion as to whether we think it's important anyway.

MR. BURTON: Okay.

The next subsection is the radioactive drain transfer system, again non-safety-related, with the exception of the containment isolation valves and the back-flow check valves. It's fully in scope.

The purpose of the system is it transfers potentially radioactive waste either from high-conductivity waste, which is the floor drains, low-conductivity waste, which is the equipment drains, and the hot shower drains to the liquid waste management system, Chapter 11.

The actual headering, as we talked about before, that's shown -- or at least was shown on the liquid waste management system P&IDs. Right now, those P&IDs are not in the big books. It was proposed that they were proprietary and were going to be taken out, but I understand that there's still some discussion about that.

MR. MICHELSON: We have a proprietary big book, volume three of it. The drawing clearly has to appear there, unless it's so secret that we don't even put it in the proprietary book.

MR. BEARD: Actually, you should not have a proprietary book anymore. If you followed the directions, all the proprietary drawings have been removed. The only proprietary book you should have it is an 8 1/2-by-11 at this stage of the game.

MR. MICHELSON: My secretary did the recording. She never told me that she threw out a whole book full of drawings.

MR. BEARD: Well, she didn't throw out the book, because we put a lot of -- a lot of the proprietary drawings were reclassified as non-proprietary. So, it just moved around in the book somewhat.

So, you still have three books, but one of them is not --

MR. MICHELSON: So, I have no proprietary book.

MR. BEARD: That is correct.

MR. MICHELSON: And now the proprietary information that we might need to look at is found where? Clearly, ACRS has access to all information for the purposes of us reviewing. Now, if you want to leave it proprietary, that's fine. We'll look at it and handle it that way, which is what we've been doing, but we aren't going to be -- you aren't going to withdraw the --

MR. COSTNER: There's an 8 1/2-by-11 proprietary book still.

MR. MICHELSON: Now, these drawings are in there. I think what they told me is we don't have the drawings.

MR. POSLUSNY: Could I clarify what happened?

MR. MICHELSON: Sure.

MR. POSLUSNY: There was a request from GE that certain information that they had called proprietary they didn't want to put in the SSAR because of problems with the Japanese. So, they submitted it on the docket, and currently, it's called proprietary information not in the SSAR.

We're working with GE to put it back in the SSAR either as proprietary, with proper justification, or as non-proprietary, with the proper cleansing.

MR. MICHELSON: But the drawings you're referring to on the non-radioactive drain system which you said were proprietary I do have. It's just a question of which book they're in.

MR. BEARD: Let me clarify. We're talking about radioactive drains right now.

MR. MICHELSON: Okay. The radioactive drains then. Do I have those drawings, how they're headered?

MR. BEARD: If you have a proper up-to-date SSAR, you should not have those. However --

MR. MICHELSON: Okay. Then how am I going to get them?

MR. BEARD: Previously, you did have those.

MR. MICHELSON: How do I get them?

MR. BEARD: I will have to check with San Jose, but I'm sure we can make them available.

MR. MICHELSON: I thought we had everything.

MR. POSLUSNY: They are on the docket. They were sent in a separate letter, and you should have a copy of that. If not, I'll get --

MR. EL-ZEFTAWY: They were not labeled as proprietary information. Amendment 33 does not have any proprietary information, the one we just received about four weeks ago.

MR. POSLUSNY: But if you had Amendment -- probably 31, I think it was in that document.

MR. MICHELSON: I had it at one time, but it might have been thrown out now.

MR. EL-ZEFTAWY: We had it under Amendment 31, but 33 doesn't have it.

MR. MICHELSON: My review I do now is based on whatever is in front of me. I don't do the clerical work of trying to keep all this straight. So, whatever my secretary hands to me is what I assume is the latest and greatest, and if she was instructed to throw it out, she threw it out.

MR. POSLUSNY: Correct.

MR. MICHELSON: And therefore, I don't have it anymore. I hope this is the only example of something that might be important that we don't have, but I don't know.

I thought the Committee had all information it needed. Basically, I thought we had the entire SSAR, but you're telling me no longer do we have the entire SSAR.

There are portions of it we do not have anymore.

MR. POSLUSNY: We told GE to put it back in, and they're working on that.

MR. MICHELSON: Okay. I was hoping, in our final report, we could make a statement that we have reviewed the SSAR, and that means we've got it, or we couldn't have reviewed it.

MR. BURTON: Okay.

This next thing -- obviously, from our last discussion, this is somewhat in error. They do not -- the lines don't meet up at the collection tanks. They're actually headered at some point before that.

MR. MICHELSON: Could we get a clarification of where they are headered? Are they headered after they enter the tunnel or before you enter the tunnel, or do you know? Maybe you can get that for tomorrow, also. I assume it's back in the tunnel.

MR. POWER: We'll get back to you on that. The drawings that we had in here did not have the headering valving. They had the individual sump valving.

MR. MICHELSON: The only way you could header it, I think, in the building is to start running through one division into another, the pipe from one division to the other, and I don't think you're doing that. So, therefore, you must be headering it somewhere in the tunnel.

MR. EHLERT: That's what I assume, too, but until I can check back with San Jose, we'll have to wait for tomorrow.

MR. MICHELSON: This is an awfully late date in this review effort to be raising these kinds of questions yet. We asked these a long time ago, and I thought we had all of the right answers.

MR. BURTON: One of the issues from back at the draft stage was what kind of back-flow protection do you have, and we talked about it a little bit. We do have back-flow protection in the drain lines serving the ECCS equipment rooms. They're safety-related, seismic, all that, and it does say that in the SSAR.

MR. MICHELSON: Back-flow protection means the check valves?

MR. BURTON: Yes.

MR. MICHELSON: Okay.

MR. BURTON: The last thing --

MR. MICHELSON: And also, is that considered to be under the safety-related ISI, the surveillance of check valves?

MR. BURTON: Yes.

MR. MICHELSON: Is it on the list of valves to be monitored?

MR. BURTON: It certainly should be. I'm not an

ISI person.

MR. MICHELSON: Maybe you can tell us tomorrow as part of your wrap-up of what is really happening here that those valves -- you can tell us whether or not they are receiving ISI as safety-related.

MR. BURTON: Okay.

MR. MICHELSON: Normally, you don't think of those as safety-related valves, but they do have an important safety function in this case.

MR. BURTON: Okay.

Finally, the system does isolate on a LOCA signal to minimize any leakage.

MR. MICHELSON: Now, what isolation valve isolates that system?

MR. BURTON: Okay. Now, I assume it would be something, what, downstream of where it's headered? Again, see, I don't know. I can't tell you the exact location at this point.

MR. MICHELSON: Well, maybe tomorrow you can. I'd like to know where the isolation valves are, whether the check valves are surveiled, and of course, whether the isolation valve is surveiled.

MR. BEARD: We will get back to you, but the system isolation I believe he's talking about is when we're pumping out from the sumps inside containment out to the rest of the system. Those are containment isolation valves.

MR. MICHELSON: Okay.

MR. BEARD: They're not isolation valves to the sumps themselves out in secondary containment.

MR. MICHELSON: Okay. Then that's further clarification. Does staff understand it that way, as well, that you don't have isolation valves on the sumps from the secondary containment?

MR. BURTON: Yes.

MR. MICHELSON: Okay.

MR. BURTON: Okay. That's it for the radioactive drain. That's it for 9.3.

Now, what we wanted to do was, for now, skip 9.4, because obviously there are a lot of questions on HVAC. What we wanted to do from here was to jump to 9.5 and specifically to talk about some of the diesels auxiliaries.

MR. MICHELSON: Okay.

MR. BURTON: Those are the subsections of 9.3.8 that are plant systems. There are other subsections in 9.3.8 that are not ours. I don't know if there were any questions on any of those.

MR. POSLUSNY: If there are any questions on those, we could handle those tomorrow.

MR. MICHELSON: Okay.

MR. BURTON: Okay.

So, what I wanted to do was to skip to the diesel auxiliaries, which are in 9.5, and then after that we'll go back and do the HVAC systems in 9.4, and then we'll come back and do specifically subsection 9.5.1, which is the fire protection system.

MR. MICHELSON: When you say diesel auxiliaries, you don't include the HVAC arrangement for the diesel engines, then.

MR. BURTON: No. The only thing that has to do with air is starting air for the diesels. The HVAC systems would be part of 9.4.

Specifically, these are the subsections in 9.5 -- fire protection, which I'd like to defer until later, and then the diesel auxiliaries -- fuel oil storage and transfer, jacket water cooling, starting air, lubrication, and combustion air intake and exhaust -- and actually, I don't have a lot to say about most of these.

Back at the draft stage, we didn't have any special issues that came up, pretty much like what's out there now, nothing special.

MR. MICHELSON: Let me ask a quick question on the starting air then.

MR. BURTON: Okay.

MR. MICHELSON: Is there any back-up of the starting air system coming from the non-essential compressed air system? Is there any connection whatsoever between the two?

MR. BURTON: I don't believe so, no.

MR. MICHELSON: That's GE's best knowledge, too?

MR. EHLERT: What was the question again, sir?

MR. MICHELSON: The question is, is there a back-up perhaps provided from the normal building compressed air going into the diesel start air tank?

MR. EHLERT: The diesel has a bottle as its primary source and uses one of the air systems as make-up.

MR. MICHELSON: One of the air systems. What do you mean by that?

MR. EHLERT: Without looking at the P&ID, I would have to check on exactly which system.

MR. MICHELSON: So, there is a connection between building compressed air and the diesel?

MR. EHLERT: I don't think so, not as a safety-related section.

MR. MICHELSON: Well, GE can clarify that for tomorrow, then. I wasn't sure. I didn't look hard, but I didn't see any obvious ones, but I did want to make sure that the site flood doesn't get back to the diesel engines before we're done.

[Slide.]

MR. BURTON: This is my last slide. The only thing I wanted to talk about was a couple of things with diesel fuel oil storage and transfer.

One of the issues that came up a few weeks ago had to do with the run of piping from the fuel oil storage tanks, which are buried underground outside the building and into the building it's g through tunnels. That was just one of a couple of issues that came up concerning tunnels.

I guess I just wanted to say at this point that we have been talking with GE, and we' t some words that are going to be going in the SSAR to clarify not just this tunnel but some of the --

MR. MICHELSON: Is the piping going to be placed in tunnels or buried in the ground?

MR. EHLERT: Piping is ced in tunnels.

MR. MICHELSON: Okay. So, then we have to worry about fuel oil running down that tunnel from a rupture of the tank or whatever.

MR. EHLERT: The tank is buried. It's bunkered.

MR. MICHELSON: Yes, but it's -- it is buried in the earth.

MR. EHLERT: Yes.

MR. MICHELSON: But the piping is not.

MR. EHLERT: The tank is bunkered. It's a sunken tank in a concrete bunker.

MR. MICHELSON: The pipe leading from the tank to the building --

MR. EHLERT: It's still below grade, in a tunnel, heading uphill.

MR. MICHELSON: How does the tunnel interface with the ground or wherever with the tank?

MR. EHLERT: From the tank, you come up to grade. The tunnel is at grade into the building, and the diesels are at grade.

MR. MICHELSON: If the tunnel is at grade, then the oil that collects in the berm is also at grade, if the tank ruptures, for instance, and if it's at grade, then it --

MR. EHLERT: No, no, the tank is buried.

MR. MICHELSON: Totally buried.

MR. EHLERT: Yes.

MR. MICHELSON: The drawings showed them above grade.

MR. EHLERT: The fire hazard analysis requires them to be below grade because of the closeness to the building.

MR. MICHELSON: Okay. So, then you're bringing the piping to grade.

MR. EHLERT: Then over. Correct.

MR. MICHELSON: Okay. Then it's probably all right. It would be nice to have that described somewhere.

Is it described where I can read it?

MR. EHLERT: Not at this time.

MR. MICHELSON: Okay. So, it's a design detail again. I guess -- I don't know -- you leave that to the COL holder and review it then or what do you do?

MR. POWER: We're responding to a series of questions tomorrow on tunnels, one of which includes the staff concern relative to fire and flood in those tunnels, and that will be addressed.

MR. MICHELSON: It will be covered then.

MR. POWER: Yes.

MR. MICHELSON: I think I'm going to propose to the Committee that -- we are depending heavily upon your written replies to our questions, and whether or not they're a part of the docket is, in my view at least, immaterial.

They're what we depend upon in writing our report, and therefore, if these change the documents GE sends to us, upon which we base our report, then that's a new game, even though it's not a part of the licensing docket. That's the basis for our arriving at our conclusions.

I don't know any other way to do it, because otherwise I keep reading -- the answers come in written one way, and then I go back to the SSAR and they're still a different way. I'm getting tired of trying to keep the SSAR up to date with the answers I get.

I'm going to assume that the answers GE gave us are right, and if there is any inconsistency, it's got to be ironed out in some other process, but we're going to write our report, and unless the Committee changes their mind, I'm going to propose that the report be based upon the written answers as a main source, because we had specific questions for which we got specific answers, and we have to depend upon those answers.

They can't be changing the SSAR later, because that changes the basis for our letter, and our letter is no longer valid.

So, it's a real muddle, but you're right, you give us good answers, and I'm appreciative of the answers. They're very good, very concise, but inconsistent with the SSAR, and that's where we're having our difficulty.

The SSAR, I assume, is just going to catch up -- by Amendment 34, it's going to catch up to your written answers.

MR. POWER: In the area of tunnels, we have been attempting to introduce new material into the SSAR that reflects what we're telling you and what we're giving you, and the concern relative to diesel tank leaking oil inside the piping, we're addressing that.

MR. MICHELSON: Okay. Good.

MR. BURTON: When you look at the SSAR, it mentions an eight-hour day tank. When you go the ITAAC, the ITAAC verification for the day tank is four hours. We thought that might raise some questions.

Basically, the four-hour commitment up in Tier 1 is based on what's in the EPRI requirements document. That's where that number comes from, and it is inconsistent with what's in the SSAR. You may interpret it that way.

MR. MICHELSON: Which way are you going to fix it? Are you going to leave it inconsistent? Level 1 is going to say four hours, and Level 2 says eight hours?

MR. BURTON: Yes.

MR. MICHELSON: That's a strange -- that's an unbelievable thing. We were assured that Level 1 reflects what's in Level 2. It's just more detailed in Level 2 than Level 1, but they're not different answers.

MR. BEARD: Alan Beard, GE.

We don't view this as an inconsistency. What we're saying is, Tier 1, the absolute information that the staff relied upon to make the evaluation, requires a minimum of four hours. However, our design goes above and beyond that and includes an eight-hour day tank, not inconsistent.

MR. MICHELSON: If it's eight hours, it's eight hours.

MR. BEARD: But we're not committing to that at a Tier 1 level.

MR. MICHELSON: Okay. So, the plant you build from this standard design may have a four-hour tank or an eight-hour tank.

MR. BEARD: That is correct.

MR. MICHELSON: That, again, blows my mind for standardization. Is that the staff's idea of standardization?

MR. BURTON: We had some discussions about this. We would prefer that it not be this way, but it is not -- what is standard is the minimum of four. That is what's standard.

MR. MICHELSON: Just say it's four and leave it at that and make the ITAAC make sure it's at least four.

MR. BURTON: That's what the ITAAC says.

MR. MICHELSON: Then do all the safety evaluations based on four hours, and we'll do the fire based on four hours. If they put an eight-hour tank in there, then we redo the fire, because there's a lot of difference in the fire hazard from an eight-hour capacity and a four-hour capacity tank.

It also affects the structural design and so forth, as well, but I'm not quarreling whether it should be four or eight. I think it ought to be consistent, though. I can't believe we'd put one number in Tier 1 and a different number in Tier 2.

It's up to the Committee as to how they want to -- I think that would be worthy of comment to the Commission, as well. It's a strange philosophy.

MR. BURTON: From our standpoint, certainly if it had been reversed, that really would have been a problem from our perspective, but we are saying that --

MR. LYONS: This is Jim Lyons from the staff. Let me see if I can shed a little light on this.

This is no different than a system -- I'm trying to think of a -- to give you a good analogy, where say system pressures -- the design of the system is given at a certain pressure in Tier 1, whereas the actual design of the system, the capability of the system is much greater than that, and so, there is a minimum acceptable pressure design, and in this case, the minimum acceptable day tank level is four hours, and the design that GE has presented shows an eight-hour tank, but the eight-hour tank would be dependent upon the diesel that is purchased, and when you do your analysis of the actual capacity of the tank, it may come out to be seven hours and 55 minutes.

MR. MICHELSON: Let me ask you, what did you use in your safety evaluation? You used four-hour day tank capacity or eight?

MR. LYONS: We used four hours.

MR. MICHELSON: Okay. Then just stick with four hours throughout.

MR. LYONS: But at the same time, in your concern about fire protection, in our fire protection review, we looked at an eight-hour tank.

MR. MICHELSON: That's where the fire protection people should put a four-tank in and evaluate it, and if, later, they want to put an eight-hour tank in, then you reevaluate.

MR. LYONS: The design in the SSAR shows an eight-hour tank. This is a Tier 1 commitment for the operability of the diesel.

MR. MICHELSON: Okay. Well, my colleagues will have to think about those things, as well. Is there any other case where you stated something in Tier 1 as one way and in Tier 2 a different way?

MR. EHLERT: Mr. Michelson, I wanted to clarify one thing on the day tank. I believe the tank size is classified as four-hour minimum.

MR. MICHELSON: I never calculated the gallon capacity.

MR. EHLERT: That's just to give you a lower bound, and that's why the safety evaluation is based on four hours. Our tank size is based on eight hours based on a diesel running and chewing, basically, up the diesel fuel at a certain rate.

MR. MICHELSON: Why don't we just talk about a minimum of four hours, then, for the SBO and so forth? What did we do in the SBO analysis, eight hours of fuel to the engine or four?

MR. EHLERT: Tier 2 is not SBO, but the --

MR. MICHELSON: It's got to be a design that's consistent with your safety analyses, whatever they are, and if the safety analysis shows eight hours of diesel fuel inside the building, then that's what the SBO analysis should use. If they use four, then it uses four.

MR. EHLERT: The SBO uses the CTG and the RCIC.

MR. MICHELSON: The CTG was not a safety-grade system to begin with. There's some uncertainties on it, and they said, well, we're only falling back to that really if all the diesels have gone anyway, but for all other analysis, we assume the diesels are operable and have got, I thought, an eight-hour capacity of fuel. Then we had to worry about transfers in the areas. This is non-safety?

MR. POWER: I guess one question is, you know, the reserve inside the building was to assure that there was a readily available supply to start, energize, and take care of safe shutdowns.

MR. MICHELSON: That's right.

MR. POWER: That's not to preclude that we can't get the rest of the oil out of the tanks and bring them in.

MR. MICHELSON: Is it safety-grade all the way?

MR. POWER: Yes.

MR. MICHELSON: The storage tanks.

MR. POWER: Yes. Yes. It's not to preclude that in any way, shape, or form. It's just to say that we're going to have this oil supply.

MR. MICHELSON: Well, I guess I'm just terribly surprised that we have two different numbers for something as important as the day tank on the diesel, but the staff doesn't have any problem with it, and if the Committee doesn't, then we'll let it go.

MR. WILSON: Mr. Chairman, we have two more presentations, one on HVAC and one on fire protection. If the Committee would like, we can start those after lunch.

MR. MICHELSON: I don't have any preference, but the Committee likes to eat lunch. It will take you about an hour to finish up? In other words, does the Committee agree to just a light lunch, so that they can let the staff go home? We'll just adjourn for lunch right now and reconvene at one o'clock.

MR. WILSON: Thank you, Mr. Chairman.

[Whereupon, at 12:00 p.m., the meeting recessed for lunch, to reconvene this same day, Tuesday, January 25, 1994, at 1:00 p.m.]

AFTERNOON SESSION

[1:00 p.m.]

MR. MICHELSON: Gentlemen, I would like to get started again. I believe the staff is going to finish their presentations.

[Slides.]

MR. RAVAL: Good afternoon. My name is Janak Raval. I am from Plant Systems Branch. I am going to present today, the ABWR HVAC systems, Chapter 9. Chapter 9.4.1.1 and 9.4.1.2 is the control room, and 9.4.1.1 is control room habitability. I just tried to make it more symmetrical with the SRP Section and SSAR, how we reviewed it. I will come back on the same slide but let me go on the second one.

[Slides.]

MR. RAVAL: All the systems were identified, whether safety related or not safety related. For example, control room habitability, that means seismic category one and safety class 3, according to SSAR table 3.2-1. It must be held to maintain the positive pressure in order to meet the GCD 19 and the filtration part. Exhaust for that particular system is exfiltration in generally normal during emergency smoke removal. We don't have any particular exhaust going out anywhere. Smoke removal, it does go out atmosphere.

Smoke removal mode will be discussed in the in 9.5.1, unless you want to discuss now.

The second part which is for high radiation, we go in the emergency recirculation mode. We don't need any exhaust. Generally, everything is isolated. We generally pulled some air to maintain one-eighteen positive pressure. For the site specific thermal mode is toxic mode, which is site specific, we are going to regulate the time to select this kind of design. It will be confirmed with Reg Guide 1.95 and 1.78 for the chlorine and various chemical evaluations.

The second part of control building is several areas in the rooms. We also maintain all the areas maintained by this system as positive pressure. This is also safety related. We don't have any particular exhaust. Everything goes to atmosphere, and it's not monitored.

[Slides.]

MR. RAVAL: The third system is the turbine building HVAC systems. It was mentioned before about not correct name about electrical building -- it's part of that turbine building. Everything is non-safety related. Inside it must be just like any HVAC systems or non-safety related system. Turbine building HVAC's, the it goes to plant vent. Generally, it's turbine building exhaust, turbine building compartment and auxillary exhaust goes to plant vent.

Electrical building HVAC's, any type system goes to atmosphere.

Every HVAC system under 9.4 generally is designed about 46 C degrees summer and 40 C degrees winter. That's our basic design criteria.

MR. MICHELSON: Those are ambient temperatures, mixed mean of the room?

MR. RAVAL: Ambient for design or each room. I can give you each room temperature, starting with the control room. Generally, we try to maintain 21 degree to 26 degree inside the control room.

MR. MICHELSON: Did you give just give me the fahrenheit, or do you have them?

MR. RAVAL: I am sorry, I don't have fahrenheit right now.

MR. SEALE: What was that upper temperature again?

MR. RAVAL: Twenty-six degrees C. Twenty-one to 26 degrees C. That will be about 83, 84 degrees. Still, it conforms to any equipment operability in site control room instruments.

[Slides.]

MR. RAVAL: For the equipment HVAC, generally we maintain 40 degrees C. That means about 104 degree maximum in summertime and ten degree C in wintertime. It's about 50 degree about.

For the turbine building HVAC, we maintain 40 degree to 49 degree C, because there's so much heat generating equipment surrounding the area. For electrical building average temperature will be about 40 degree C.

MR. MICHELSON: These are upper limits, of course.

MR. RAVAL: For the reactor building, generally, you may have noticed that in my slide it's according to building and which system is in those buildings. I have one typographical error here, which we will correct on your distribution, for the reactor building safety related diesel generator HVAC's. It's supposed to be safety related.

I put the SGTS to Section 6.5.1. It doesn't belong there but it's safety related, and that system takes over when the reactor building secondary containment HVAC is not operable and the other signals do not. In the reactor building HVAC I have about six or seven systems, how you divide it and subdivide it. I didn't give any particular number, which system goes first or second.

MR. MICHELSON: What do you mean by inside atmosphere. This is for the reactor building secondary containment HVAC system.

MR. RAVAL: Right.

MR. MICHELSON: Part of that system is inside of secondary containment and part of it is outside of secondary containment.

MR. RAVAL: I meant inside atmosphere it means systems served by those rooms to maintain at pressure.

MR. MICHELSON: What you are saying is just negative pressure is maintained within secondary containment.

MR. RAVAL: Right.

MR. MICHELSON: But that the system may or may not be in secondary containment.

MR. RAVAL: That's true.

MR. MICHELSON: Standby gas treatment is, but reactor building HVAC is not, at least most of it is not.

MR. RAVAL: That's true. The supply is some in turbine building and exhaust on other side in other area is from reactor building. Area means the area being served. Generally, we maintain negative pressure and secondary containment for normal operation and during accident conditions. In either case, safety or non-safety systems, will go to the monitored plant vent.

The third system I have is equipment HVAC systems. We have FCU's which is internal circulation only.

MR. MICHELSON: Your third item down from the top, I am not sure what you have included there. Is that the standard name that GE gives that system?

MR. RAVAL: Yes.

MR. MICHELSON: Reactor building safety related equipment.

MR. RAVAL: HVAC, right.

MR. MICHELSON: The reactor building has safety related equipment, both inside and outside of secondary conta'nment. There is one system that serves inside of secondary containment and another system serves only outside secondary containment. I guess that's the one outside secondary containment. That's not the name of it.

MR. EHLERT: It should be the ones inside secondary containment.

MR. RAVAL: This is inside secondary containment.

MR. MICHELSON: The third one is just inside secondary containment.

MR. EHLERT: That name should be reactor building secondary containment, safety related equipment HVAC system.

MR. MICHELSON: That's the name I recognize. I would suggest that the slides reflect the names of the systems as the correct nomenclature. Otherwise, I am never sure which one it is.

MR. RAVAL: Yes. That on should be this one. Reactor building safety related equipment HVAC system; is that correct?

MR. EHLERT: No. That's not what the SAR says.

MR. MICHELSON: That's not the title of that system, is it?

MR. EHLERT: If you go by that title, we will have two systems with the same name.

MR. RAVAL: It can be. One is electrical equipment HVAC and one is safety related equipment HVAC. They are two different things.

MR. EHLERT: Okay.

MR. RAVAL: Under the safety related HVAC is the ECCS pumps and RHR, RCIC, SGTS, SPCF. They are all in secondary containment. I didn't have any particular diagram, but TSC contains cooling coil, and this is internal recirculation only. There is no exhaust for it.

We have other internal recirculation FCU and SCU type. We have non-safety related equipment HVAC and main team tunnel HVAC's, and there are so many about eight of them non-safety related when we studied the SSAR. So many rooms, ISI rooms. I can go over the other figures, which I didn't make any slide on it.

MR. MICHELSON: Your nomenclature is correct, according to the SSAR.

MR. RAVAL: Talking about non-safety MSR which serves a total of about ten areas, TSC, ISI, CRD replacement, CRD repair area, plant radiation, suppression pool clean up, fuel cooling A and B that used to be the safety related but is not non-safety related anymore. Main steam tunnel is non-safety. I didn't put down that it's supposed to be to atmospheric conditions, whatever they have. Ambient condition exists at that time. All are internal recirculation.

I think I am going to go one more and confuse you now, this title and that title. This is electrical equipment HVAC's, diesel generator room, reactor room, equipment room and HVAC system. Safe shutdown room, I think they have separate designation for that. This is diesel generator engine room, control panel room, electrical equipment room, HVAC equipment room, remote shutdown panel rooms, and diesel generator area. It's about eight. It was supposed to be seven, but one is internal recirculation.

I think Butch mentioned earlier that there is essential chill water supply applies to the control building, both HVAC systems and one of the safety related electrical equipment HVAC systems. You use the safety related chill water system for cooling.

[Slides.]

MR. RAVAL: Let me put a slide on here. The reactor building, separate electrical HVAC systems, we have three divisions. I think it's over six different areas, Division A, Division B, accordingly. There are two fans, one standby exhaust, one standby. Any safety related system will have the will have the barrier that will react with any applicable electrical outlet. I think I want to discuss right now the external smoke removal mode. We can do now the supply fan, bypass exhaust fan, it goes directly to atmosphere.

We have diesel generator track systems. For the normal ventilation and during the accident conditions, it's being served by electrical equipment HVAC's. When the diesel generator is on, the two big fans runs on all the time, automatically. That also maintains a positive pressure. If you want to distinguish, this particular HVAC on this only has two big supply of fans. The burst out the air from outside exhaust louvers. They will supply air for the diesel generator.

MR. MICHELSON: You say there, that the diesel generator HVAC system keeps the diesel compartment at a positive pressure?

MR. RAVAL: Right.

MR. MICHELSON: How does it do that, with all those big open louvers, open to atmosphere?

MR. RAVAL: I think that they have --

MR. MICHELSON: I realize they have a supply and an exhaust, but you can't keep the room at a positive pressure with that much leakage unless you put closures on those louvers. I wasn't aware that there was any closure, but maybe there is.

MR. RAVAL: I don't have that particular slide for that.

MR. MICHELSON: I don't think you have it. The closest you come is your diesel 215-5 I is the diesel generator compartment. That's for the direct fans. That shows louvers without any valving arrangement. Therefore, the room is an open room, and it's open louvers to atmosphere. You can't maintain a positive pressure in the room with the ventilation systems.

I don't think you need to keep it positive, by the way, either. I am just pointing out on your slide that you claim it as positive. I wondered if maybe there are valves on the louvers with closure capability on the louvers. Are these gravity fed?

MR. EHLERT: Yes, they are gravity dampers.

MR. MICHELSON: Closed.

MR. EHLERT: Yes.

MR. MICHELSON: I didn't gather than from reading it. That would be one way. Of course, the gravity doesn't work on the exhaust side. How much pressure does it take to open it?

MR. EHLERT: I am going off the top of my head right now. When the diesel generator fan is running in tandem they are pushing about 150,000 cubic feet per minute out through those louvers.

MR. MICHELSON: That's enough, of course, to open them.

MR. EHLERT: Right.

MR. MICHELSON: Now, where do they close at then?

MR. EHLERT: That's on the suction side. For the diesel generator there is two louvers.

MR. MICHELSON: Yes, one on suction and one on the discharge.

MR. EHLERT: Right. All it does is, you get a suction of the 150,000 and blow straight down to the diesel, and then it --

MR. MICHELSON: The exhaust out.

MR. EHLERT: The exhaust out of the same louvers.

MR. MICHELSON: What positive does it take before the exhaust louvers open? Is that over one-quarter of an inch. If it is, and one-quarter inch is all you are claiming on the room, yes, you can --

MR. EHLERT: I believe it is over one-quarter inch. Those two fans are going to generate quite a bit.

MR. MICHELSON: Yes, that's right. For some reason, I didn't even realize that those were gravity loaded louvers. That explains it, then.

MR. EHLERT: They do have a designation GD on them, which is gravity damper.

MR. MICHELSON: That says TD. What's a TD? GD, I interpreted it as gravity damper, but TD, I don't know.

What's a TD?

MR. EHLERT: That's tornado damper.

MR. RAVAL: Tornado damper.

MR. MICHELSON: What is its normal method of operation during normal plant operation?

MR. EHLERT: It has a two psi limit on it for negative suction. It's basically on tornadoes, you would prevent the room from being sucked down in a tornado.

MR. MICHELSON: I don't think you have any control over them. I think what happens is, the negative pressure opens them so that you do suck down and don't put the load on the walls, I think. I don't know. You tell me.

MR. EHLERT: The building is not vented. The dampers in a tornado event, the load goes on the walls.

MR. MICHELSON: It does. Those dampers take a two psi before they even open, or three.

MR. EHLERT: That's for the tornado dampers. They are normally open. Normally on an advanced warning of a tornado approaching.

MR. MICHELSON: If they are normally open, how does the normal ventilation system keep a positive pressure in the room?

MR. EHLERT: The gravity dampers and the volume dampers are not shown on tier one. They are on the SAR drawings.

MR. MICHELSON: They are not using the same -- these are normally open, but they must have some other damper in the way to keep them closed so that you can keep a pressure in the room.

MR. POWER: We would like to give you more information on that.

MR. MICHELSON: It's not clear. Okay.

[Slides.]

MR. RAVAL: This system I have for the diesel generator is reactor building primary containment supply and exhaust. That is concept related. That goes to monitor plant vent. Let me put a slide on that. I think as a part of that reactor building secondary containment HVAC systems, using the sump part of it, it's usually the same supply fan -- two or them are operating. It's only one fan and the clean up systems goes to that primary containment. It comes back and goes to the exhaust. If it is at the exhaust then it doesn't go here, it goes to SGTS and goes through the steps.

MR. MICHELSON: Just for clarification, on the diesel generator compartment you have these two large fans for the cooling during the time when the engine itself is running, and they are very large capacity. Are those two fans called a HVAC system by itself, or what?

I was looking at Table 9.4-3 in the SSAR and there, they talk about diesel generator HVAC Division A. I think what that is are those two big fans. Is that an HVAC system, per se.

MR. RAVAL: What I tried to give in the title, they are called reactor building safety related diesel generator HVAC system.

MR. MICHELSON: Yes, right.

MR. RAVAL: That's also served by the safety related electrical system HVAC system too. Both systems are on, electrical system HVAC and diesel generator HVAC, when in accident condition.

MR. MICHELSON: Are you saying that when you have the accident condition, that you continue to run the normal ventilation to it as well?

MR. RAVAL: Yes.

MR. MICHELSON: The air is blowing through at an enormous rate. I don't know what the normal ventilation will even do for you. You are moving through 160,000 cubic meters an hour with the fan. HVAC is trivial, by comparison.

MR. EHLERT: That room is only in normal operation when the diesel is not working, the reactor building electrical equipment HVAC system -- safety related HVAC system -- provides fresh air for when you are doing maintenance in that space. During diesel operation the diesel generator HVAC system is going to supply air and air for pushing up noxious fumes.

MR. MICHELSON: Is the electrical equipment system which is supplying all of that outside of secondary containment and is also supplying diesel compartment, is it isolated, the diesel load portion of the diesel compartment portion isolated?

MR. EHLERT: No. The electrical equipment area HVAC is required to maintain the electrical equipment room areas which are not part of the diesel generator.

MR. MICHELSON: There are a couple of closed rooms within that, and you are saying they still have to -- they don't get the big cooling for the engines.

MR. EHLERT: Right.

MR. MICHELSON: Okay.

MR. EHLERT: Also, there is no chilled water cooling on the diesel generator HVAC air.

MR. MICHELSON: That's right. It's just right out of the atmosphere. You don't consider than an HVAC system, those two big diesel fans.

MR. EHLERT: Per se it is, because it has its own plenum.

MR. MICHELSON: It hasn't got any air conditioning on it. HVAC normally means --

MR. EHLERT: It has a filter on it. It has a filter, so it conditions the air.

MR. MICHELSON: Okay. I understand which one it is now.

MR. RAVAL: Electrical equipment HVAC and the diesel generator fans to maintain the temperature inside the diesel room, below 45 degrees C. This is service building HVAC which is non-safety related. This particular building is served by two systems, actually divided into two different areas. One is technical support center and other clean areas served by technical support center HVAC system, which is non-safety related. It maintains positive pressure. This is just normal mode of operation which goes to the atmosphere.

TSC is to control room but is not meant to meet GDC maintained. They tried to provide non-safety related systems similar protection. During the high radiation mode it goes through exfiltration. That's why we maintain positive pressure of the habitable room.

The other part of the building which is balance of SBA areas which is served by control HVAC, maintains negative pressure. It's not safety related. Any toxic concern that is site specific will be reviewed later. Anything exhaust goes to monitor plant vent.

MR. MICHELSON: Just a small clarification. This morning I thought I understood that you no longer run heating coils, hot water heating coils, to these essential HVAC's. Is that correct, or did I misunderstand.

MR. EHLERT: I believe that is true, yes, sir.

MR. MICHELSON: The drawing still shows the heating and cooling coil.

MR. EHLERT: Which figure?

MR. MICHELSON: I will take that back. It does, on the secondary containment.

MR. EHLERT: In turbine building, yes, non-safety.

MR. MICHELSON: It's non-safety.

MR. EHLERT: Yes.

MR. MICHELSON: Go ahead.

MR. RAVAL: The last slide on the --

MR. MICHELSON: Just for follow up, how do you show the electrical coil that you now have in there?

MR. EHLERT: It should be a coil shown with -- it says electrical coil, if I remember right.

MR. MICHELSON: I would have thought something like that. I don't see it. Cooling coil, that's the cooling coil. There is no electrical --

MR. EHLERT: Look at the first figure, 9.4-1, I believe that on the control room you will see it. Some of the systems don't need heating at all, because of their internal heat generation.

MR. MICHELSON: Yes, that's right. 9.1-4 should have one on it.

MR. EHLERT: It should have two, in fact.

MR. MICHELSON: It has the bag filter on it and cooling coil on it. Go ahead. Don't let me hold you up.

MR. RAVAL: The HVAC system which is also non-safety related, it has two different areas. One is the control room zone, served by the building HVAC's. For that particular system it maintains ambient temperature inside those rooms served by that system is positive pressure. Exhaust goes to exfiltration only. The other area, the egress building, which is served by HVAC is non-safety related maintains the negative vessel. It goes to monitor plant vent.

MR. MICHELSON: A general question on heating and ventilating before you go further. I looked at the electrical drawings that are in the SSAR, and I couldn't find these HVAC systems as electrical loads on the one line diagram. Did I miss them, or are they too low of a level?

MR. EHLERT: They are either small -- I believe they are hanging off the MCC's. You have to go to a very low level.

MR. MICHELSON: We have no MCC drawings.

MR. EHLERT: I believe they are off the MCC's, if you look at the load list.

MR. MICHELSON: None of them were up at the 480 load level then.

MR. EHLERT: No.

MR. MICHELSON: All the fan motors are what?

MR. EHLERT: They are off the MCC's also.

MR. MICHELSON: They are all what, 110 or 220?

MR. EHLERT: I don't remember.

MR. MICHELSON: They could be off the 480 too and be on MCC, it's big enough.

MR. EHLERT: I think it depends on the fan. A lot of the fans are maybe on the MCC's. The secondary containment HVAC might be on the load list. I am not -- they may be on MCC, I don't remember which.

MR. MICHELSON: That explains it. We didn't get down. It's hard to make a judgment on physical separation. Electrical looked fine as far as it went, but I couldn't tell what was hanging on the MCC's and a number of areas because it didn't have any detail. I don't know what the staff does. I guess they just assume that these things are physically separated by the general rules.

MR. POWER: You recall when you read in Chapter 8.3, we stipulate all those MCC divisional separation criteria.

MR. MICHELSON: The criteria are there. I have no problem with that. I was just kind of checking on a couple of them. Heating and ventilating was of particular interest, so the backup control room and where it was getting its heating and ventilating electrical power from, I got interested in it. I couldn't trace it because I had no information in the SSAR.

It becomes important, at least on the back of the control, to make sure it has physical separation of power supplies. Go ahead.

[Slides.]

MR. RAVAL: My last slide on this HVAC's, some drywell cooling system inside the primary containment. I think we discussed this under Butch's presentation. GE pointed out this particular drawing, which is non-safety related. It's only internal recirculation only. Ambient conditions exist.

MR. MICHELSON: That's a non-safety system all right, but I am kind of interested in how you insulate it and so forth to keep that crap out of the suppression pool. I couldn't find that detail anywhere. Did I miss it, did you describe it somewhere, or just remain silent on the insulation for this system. It's a big system.

MR. EHLERT: These are open ducts.

MR. MICHELSON: I think it has sweating problems and so forth, that require that you insulate it. It has chilled water coolers, cooling water. If you don't insulate the ducts, they are going to be raining.

MR. MCCRACKEN: That issue is still under review by Rich's Branch. They haven't completed the evaluation of how they are going to handle the event. GE hasn't given them final submittal on how they are addressing it.

MR. MICHELSON: You don't know whether there's any insulation problem here. I don't know what the insulation is first of all, do you?

MR. MCCRACKEN: From this system design there's no issue. The issue is from what would come down and get into the pool.

MR. MICHELSON: Do you know for this system design, how they are insulating it?

MR. MCCRACKEN: No.

MR. MICHELSON: That's something that you need to know, even though it's a non-safety system. You have to know that before you can do the analysis.

MR. MCCRACKEN: Right. What I am saying is, it's part of the analysis. What they are resolving is that issue. GE hasn't provided that. That is being actively worked on.

MR. MICHELSON: That, we will hear from, by the end of February, I guess.

MR. POSLUSNY: Right. That will be a mark up of the SAR.

MR. MICHELSON: It will be something that we hear about before we issue our final report, won't it?

MR. POSLUSNY: Yes. It will be a mark up of the SAR.

MR. POWER: One item on the drywell cooler, there is ducting that goes to lower drywells and other areas. That ducting is not insulated. It's up at the units themselves, and they are in the upper drywell.

MR. MICHELSON: Maybe what you are telling me is that there is no insulation required for the system, in which case that problem goes away. I know that, and it ought to be said in the SSAR, no insulation will be used.

MR. POWER: I think the ducting, I believe, has no insulation. The chilled water pipe may, and that's wherc the issue comes into play.

MR. MICHELSON: If that's all it is, that's solvable. There is bigger choice of insulations for that.

MR. DAVIS: I have a question, Mr. Chairman. Is this drywell cooling system necessary to maintain an accurate measurement of the reactor pressure vessel water level?

MR. MICHELSON: In post-accident or normal?

MR. DAVIS: Normal. In other words, if you lose this system you also lose eventually the capability.

MR. EHLERT: There is a tech spec upper limit on drywell temperature which, if we exceed by -- I forgot the temperature limit that's in the tech spec for it -- we go out of tech spec. The reason is, when the drywell temperature gets too warm we will lose the water level.

MR. DAVIS: The tech spec limit is below the temperature at which that occurs, I presume?

MR. EHLERT: I will find out for you. I am not exactly familiar with that operation.

MR. POWER: One item that we looked at relative to the item that we are going to talk about tomorrow is high temperatures that occur in the secondary containment, external, and those influences that might be on water level indication. That's one area that we are going to discuss tomorrow.

The second one is, there is temperature compensation devices put on these to take into account temperature density aspects relative to water level systems. That's a step above what the current plants have now in this regard.

MR. DAVIS: Thank you. The reason I brought it up is, I understand that one of the few remaining outstanding issues between the staff and GE is a redundant and diverse reactor vessel water level measurement. Here, might be a case where it would be useful to have that, if you don't have safety related drywell coolers.

I had another question a while back here, that I forgot to ask at the time. This may be a little off the wall, but that's never stopped us in the past.

Some diesel generators -- I don't know about yours because I couldn't find this detail in the design -- have a positive crank case differential pressure trip. It occurred to me that if you lose offsite power you will also lose momentarily the HVAC system that supplies the diesel generator rooms, and you will get a loss of the positive pressure in the room.

I would hope that this doesn't also trip the diesel when it tries to start, because of the differential pressure change across the crank case in the diesel generator. Do you follow this? This has come up before, concerns over having a differential pressure created by a tornado which might pass over the diesel generator. I always thought that was a little bit far fetched. This case might be a little more important.

MR. RAVAL: We have tornado protection on diesel generator on both sides, inlet and outlet. I don't know about the trip side. GE can clue me in, if they have anything on it.

MR. EHLERT: I will have to get back to you.

MR. MICHELSON: I thought it was just a high pressure, not a differential pressure. Of course, any device which measures pressure is differential to something.

MR. DAVIS: Yes, that's right. Do you know, Charlie? Is this a typical trip? I know it is on some older plants, differential pressure trip to try to protect the engine. I am sure it's not a problem.

MR. EHLERT: I don't have the diesel people here. I will check it and get back to you.

MR. RAVAL: How many trips have we had before in past, it was that kind of circumstances you described.

MR. DAVIS: Pardon me?

MR. MICHELSON: One more question on ventilating. This air compressor room that we talked about earlier today, which system cools that room?

MR. EHLERT: The turbine building ventilation system or turbine building compartment, HVAC system. It's in the controlled area part of the turbine building in the basement, if I remember right.

MR. MICHELSON: That has a single system supplying all the air for that, including those switch room gear rooms and so forth.

MR. EHLERT: Plus, some room coolers.

MR. MICHELSON: It could have ventilation louvers in it as well.

MR. EHLERT: Yes.

MR. MICHELSON: What I was looking at is, I think it comes off the turbine building air conditioning system, heating and ventilating system. I wondered if we get one of these turbine building pipe ruptures such as the circulating water or whatever and it starts to rapidly flood the building, is there any chance that the water gets into the ventilation system in those areas and backs up into this other area by that means, and thereby floods the service building because it's directly connected to the service building and it's below grade.

Have you checked out the ventilation system, to make sure that all the attachments are above grade. Even though the room is below grade, I think you have to bring the connections out above grade if you are going to avoid floods.

MR. POWER: I don't believe we identify the ducting runs for that system.

MR. MICHELSON: It should be. I don't think you have yet, either. I think it snould be a design requirement, that the ducting runs for that system be above grade while in the area that can be flooded.

MR. EHLERT: I misspoke earlier. It's in the electrical building HVAC system, so it's on the clean side. It would be in a separate building from the turbine building, service water and circ water systems.

MR. MICHELSON: The, the electrical building ventilation system does just that area.

MR. EHLERT: Right. It's in a clean area.

MR. MICHELSON: I looked at the drawings and I didn't find it that way, but I may have not read it correctly. I will just have to go back and look. I found it on the turbine building ventilation drawings.

MR. EHLERT: I believe that building has eight and one-half by eleven sheets instead of the full size sheets for HVAC.

MR. MICHELSON: I was looking at full size sheets.

MR. DAVIS: Mr. Chairman, I think I have my questions answered. I will save GE some work. Mr. Burton has pointed out to me that indeed, the crank case does have a trip on high pressure, but it looks like it's high absolute pressure. That would not be a problem in the case that I have postulated. Thank you.

MR. WYLIE: Does it say how high?

MR. DAVIS: No, it doesn't.

MR. MICHELSON: The absolute pressure device still has to be vented to atmosphere, depending on the design of the device.

MR. DAVIS: The crank case itself is exhausted.

MR. MICHELSON: Yes. What's that in this for is the ring leakage. You bust a ring or something and that tells you that you better not run it or you will go off the crank case -- or a piston break, yes. Why don't you proceed.

MR. POSLUSNY: We are ready to go onto fire protection now.

MR. MICHELSON: [illegible]

MR. HOLMES: [illegible] noon. My name is Jeff Holmes, from Plant Systems Branch, Division of Safety Systems and Analysis. I am here to talk about the other auxillary systems, specifically, fire protection.

GE's ABWR fire protection design was reviewed against the current fire protection guidelines, specifically, branch technical position 9.5-1 and the enhanced fire protection for advanced light water reactors, as indicated in SECY 90-016.

Upon my review, GE has met the current fire protection regulation, or has provided justification that the current design is satisfactory. GE has also met the fire protection criteria as stipulated in 90-016, which exceeds the current fire protection regulation.

SECY 90-016 requires a design that assumes that all equipment in one fire area will be rendered inoperable by a fire, and that re-entry into the fire area for repairs and operator action is not possible. GE must ensure that safe shutdown can be achieved. That's one of the things that they must do. GE has accomplished this by providing three separate safe shutdown trains, which are physically and electrically isolated.

SECY 90-016 also requires that smoke, hot gases or the fire suppression will not migrate into other areas, to the extent that they could adversely affect the safe shutdown capability including operator action. GE has designed a smoke control capability which will prevent the migration of smoke outside the fire area. Very conceptually, basically what they do is in the fire area, what they will do is reduce the pressure and in the other areas they will increase the pressure.

MR. MICHELSON: For that thing to work, if it works in principle as you just outlined, you are in good shape. It's not clear to me that the equipment required to keep the fans exhausting from the fire area for instance, that the equipment is divorce from the fire occurring in that same area. If it turned out that you lose the fans as a consequence of the fire, then you don't have this smoke removal.

My question is, so what. How important is smoke removal to the safety of the plant.

MR. HOLMES: To answer your question, I would have to look at each of the different fire areas. I would be worried about the area that has a lot of combustibles in it. If I can have a large amount of oil --

MR. MICHELSON: It is a fact that the ventilation system is divisionalized, and that it might be in the division that has the fire. It will be. What you are doing is, on two divisions you are trying to keep a positive pressure and the third one you are trying to exhaust with a negative pressure.

MR. HOLMES: That's correct.

MR. MICHELSON: It appears to me, that negative pressure may or may not be assured because that's where the fire is. You would have to see where the cable runs go and where the fans are. You would have to research it.

Just for the sake of argument, I would postulate that the fire also gets to fans, in which case is it a concern.

MR. HOLMES: I understand.

MR. MICHELSON: Is that a safety issue. Do you have to have the differential -- do you have to have the smoke removal feature.

MR. HOLMES: Do you have to have it?

MR. MICHELSON: Yes.

MR. HOLMES: This is an improvement for the new reactors.

MR. MICHELSON: For safety, that is.

MR. HOLMES: This is an improvement for the new reactors. If they were to lose ventilation, what they would have to do is bring in portable equipment. I would consider it a concern if I had areas with large amounts of combustibles, if I had a large oil release. Other than that, I don't think it's a big safety problem.

Should it be designed to be separate, I think that would be a good design.

MR. MICHELSON: The ability to exhaust the smoke ought to be independent of the fire that is causing the smoke. That's not a design requirement, if I understand it.

MR. EHLERT: SECY 90-016 requires that you have provisions for controlling smoke. Let's address this as two steps. First, reactor building secondary HVAC, which has smoke removal mode. Those fans are located over in the turbine building, and we are worried about fires inside the reactor building. Obviously, those fans will not be affected by a fire in the reactor building.

The other area now, looking at the fan --

MR. MICHELSON: I don't think those fans are in the turbine building.

MR. EHLERT: Yes, they are.

MR. MICHELSON: How do you get that big ducting from the reactor building to the turbine building?

MR. EHLERT: It runs across the top of the control building.

MR. MICHELSON: You are right. That is true, correct.

MR. EHLERT: To address your other concern, let's take an area like the safety related electrical areas in the reactor building. Yes, you could postulate that a fire in an affected division could disable that. But what we are doing in the other divisions is, we are maintaining them at a positive pressure relative to that other one to prevent smoke from migrating out into those areas.

We may not have smoke removal capability for the affected division, but we are trying to prevent it from affecting the rest of the plant.

MR. MICHELSON: That's the case where you have to answer the question then, so what. Is the smoke removal essential.

MR. EHLERT: GE's position would be that while it's desirable it is not absolutely necessary.

MR. MICHELSON: There, is a case where you are in the electrical division that is supplying the fans and so forth.

MR. EHLERT: Correct.

MR. MICHELSON: That's probably the case I should have cited to begin with. Yes, that's the one that will get you. I didn't see it discussed and I don't know how important smoke removal is. Our fire experts and Dr. Catton is not here today, but he's been pursuing it somewhat.

There are various views on the part of our experts as to whether this even works or not to begin with. I asked, so it doesn't work and how important is it. That part of the discussion I can't pursue very easily.

I just wondered if anybody had pursued it at all, as to whether smoke removal for these kind of confined areas is essential to the safety of the plant. My intuition says it's not. That's why I asked the question. I guess the staff doesn't really have a concern whether smoke removal is required or not. If it is required, of course, then you have to do it differently. You have to do it redundantly and whatever, or at least supply it from a division not affected by the fire.

MR. HOLMES: Again, they do have the other capability, bringing in these portable ventilations and removing the smoke.

MR. MICHELSON: I don't think that's a very practical thing. We are talking about big ventilation rates to be effective, and you don't have the equipment even on site to do that kind of work unless you are going to require it be on site.

MR. HOLMES: Again, when we are fighting the --

MR. MICHELSON: These are big fans. These are as tall as you are.

MR. HOLMES: What we are trying to do is make sure that the fire fighters can get to the base of the fire. One, we would need a large enough fire to prevent that type of smoke to be developed. Again, I said it was based on the combustibles in the plant. If I have a large amount of oil, I agree with you wholeheartedly. If it's not that much, they can remove the smoke using these portable ventilation pieces of equipment.

MR. MICHELSON: Okay, go ahead.

MR. HOLMES: GE design has met the current regulation, SECY 90-016, which has resulted in reducing fire as a significant contributor to the likelihood of a severe accident. What I would like to do now is open it up for questioning.

MR. MICHELSON: On the fire protection there is in the SSAR, I think, a pretty detailed fire hazards analysis. However, that analysis does not necessarily reflect what the actual plant will look like when it's finished, since there is a lot of information simply lacking.

Is there going to be a requirement that the fire hazards analysis be redone by the COL applicant?

MR. HOLMES: My understanding is that the fire hazards analysis will be redone. It will include --

MR. MICHELSON: Is the ITAAC going to reflect that and require somebody to check it?

MR. EHLERT: There are two requirements to address this. One, we have had in the SAR for a long time, the COL applicant requirement to re-perform the fire hazards analysis for any assumptions that were not valid from the previous one. To address a concern that you raised during our last meeting or the meeting before that, where you felt it was necessary for tier one treatment, we have reviewed that position. Although we are not happy about it, we are going to go ahead and put a requirement in.

MR. MICHELSON: It will be in the next submittal.

MR. EHLERT: Yes.

MR. POWER: A letter has been sent from General Electric to Tom Boyce, presenting the positions of those comments you made. We have a summary chart of those comments available for your look-see tomorrow.

MR. MICHELSON: All right. That one has gone to bed by putting in the requirement. I don't see why it would have been objectionable to GE to begin with because, clearly, the hazard analysis has not yet been done. You can't do it until you got the plan in mind. Therefore, why would anybody object to doing a hazards analysis, even though it has to be done later.

It's a good analysis. I got more information out of Appendix 9-A than I got anywhere else in the SSAR. It's a very good analysis. It has a few errors in it, but those will be worked out by the COL applicant.

Are there any other questions? We beat fire protection several times in the past to death, so I didn't anticipate too much more questions at this stage of the game. It was on the agenda for any clean up questions. I thought maybe Ivan would be here because he's had several hanging around, but he's not here to present them. I don't have any further ones. Do any other members have any further fire protection questions?

You looked at the PRA, Pete, and basically it's a fire hazards analysis. It's not clear to me, are they going to do a fire PRA in addition to the fire hazards analysis? How do we convert 9-A into a risk number?

MR. DAVIS: As I recall, there is a fire risk assessment as part of the PRA. It's not what I would consider a fire PRA, but it's certainly a fire risk assessment.

MR. MICHELSON: It takes that Appendix 9-A and kind of converts it into a number?

MR. DAVIS: Yes.

MR. MICHELSON: That somehow is a step that needs to be --

MR. DAVIS: GE may object to that characterization.

MR. EHLERT: No. I think that accurately reflects it. We had somebody back here that gave you a presentation on the fire risk assessment that we did.

MR. DAVIS: It's my understanding --

MR. EHLERT: It's not a modified five methodology.

MR. MICHELSON: That doesn't come up with numbers, though.

MR. EHLERT: We set screening criteria.

MR. DAVIS: It's screening.

MR. MICHELSON: How do you put that into your PRA which is in Chapter 19?

MR. DAVIS: You mean, in terms of core damage frequency?

MR. MICHELSON: Yes.

MR. DAVIS: You don't. What you do is, if you go through the five methodology you gain assurance that it's not going to be a significant contributor, but you don't know exactly what it is.

MR. MICHELSON: So, what we have done really, is just the five methodology and not a fire PRA.

MR. DAVIS: Which is acceptable, according to the staff's memorandum.

MR. MICHELSON: That was my question, whether it was going to be a fire PRA or not. Is it in there or is it not going to be in there?

MR. DAVIS: My preference would be a fire PRA, but the five methodology does meet the requirements. It has to be re-done, as part of the staff requirement for the PRA to be re-done, as I understand it. It will be picked up there again.

MR. MICHELSON: It will be picked up there as well.

MR. DAVIS: By the COL.

MR. MICHELSON: We don't have a direct coupling between the five methodology and a PRA methodology we normally pursue for the rest of the plant. It's just that the speculation that if we pass all these screening criteria and so forth, that somehow we have an extremely low probability of a fire problem. Therefore, we don't even put it in the analysis when you do the PRA, which is a little bit uncertain.

MR. DAVIS: It requires a little space.

MR. MICHELSON: That coupling has not been established.

MR. DAVIS: I looked at it --

MR. MICHELSON: If you do the five methodology, that you now have a sufficiently low risk from fire that it need not be considered.

MR. DAVIS: I looked at it in some depth, and I agreed with GE's conclusion. I had some problems with some of the numbers but nothing looked like it would change the conclusion.

MR. MICHELSON: I guess you are saying the methodology does indeed, if carried out properly, would result in a conclusion that fire is a non-problem.

MR. DAVIS: Yes.

MR. MICHELSON: I don't make that same coupling, but that's a different issue. Anybody else?

[No response.]

MR. MICHELSON: Seeing none, I think that's it for you.

MR. WILSON: Mr. Chairman, we are ready to begin with Chapter 14 now, if you are ready. We will discuss 14.2 first. The first to speak will be Mr. Gramm.

[Slides.]

MR. GRAMM: Good afternoon. My name is Bob Gramm, Quality Assurance Section Chief. Our group has lead responsibility for the initial test program reviews. I have with me today, Frank Talbott, who assisted in reviews for the ABWR.

Section 14.1 is not used in accordance with the SRP. That's only for preliminary safety analysis report information, so that's not applicable. In 14.2, the initial test program covers several phases of testing, post-construction, preoperational or pre-fuel load testing, the initial fuel loading phase as well as start up power ascension, post-fuel load testing.

The primary objectives, there are four of them for the initial test program. They are to validate the plant has been constructed in accordance with design requirements, to validate the transient analysis and analytical approaches that have been used during the process. It provides an opportunity for permanent plant personnel to become familiar with the plant, by being involved with the conduct of the test program. It also provides the opportunity to validate permanent plant procedures, both normal operating and emergency plant procedures.

The SRP Section 1.42 and Reg Guide 168 provided the guidance for 14.2. It covers both administrative controls as well as technical information that is contained in concise test abstracts, which are provided in Section 14.2. By way of administrative controls, we examined staff qualifications, procedure formats, procedure review processes, qualifications of test personnel. The test abstracts provide information in regards to test prerequisites that need to be completed before entering into the testing methodology, the purpose of the system test, and ultimately the acceptance criteria by which one would judge the acceptability of the overall pre-operative start up test conduct.

Our review identified a number of areas where GE augmented test abstract information, particularly with prerequisite information on supporting systems, interfacing systems that need to be available for testing, test acceptance criteria. A number of cross references were provided which facilitate getting back into the detailed SAR information which provides acceptance criteria. Some additional regulatory guide commitments were made during the course of the review.

We do have a number of COL items, where further information is going to be provided down the road by the COL applicant. Those are left open for the review. We do have some minor clean up issues which will be resolved, post-Amendment 33. The ITAAC review process has identified that the lighting system test abstract system needs to be augmented to a slight degree. Rod block monitor testing during the start up phase is also going to be augmented to a slight degree in a test abstract.

Other than those items, our review is clean at this point in time. I will open it up to any questions that you have.

MR. MICHELSON: I guess we are open to questions.

MR. GRAMM: Yes, sir.

MR. MICHELSON: The person who was going to review this and ask the questions is not here. I didn't review it, except in a couple of areas where I had some questions. I think that it seems to be okay there. I don't know about the rest of it. Did anybody else look at any other parts of Section 14?

MR. COSTNER: I looked at 14.3, but I think we decided earlier that probably what I observed are not appropriate to our charter.

MR. MICHELSON: You can discuss them if you want to the Committee, and see if you get sympathy there.

MR. DAVIS: We have his letter, I guess.

MR. MICHELSON: Yes, you have the letter. You can look at it, and see if you have any questions on it. The problem with this whole certified design business is, I think the Committee has taken a reasonably firm position that all we are doing is reviewing this design from the viewpoint of safety. We are not getting into the certification process. We didn't even get into the ITAAC's and so forth, except in the case of the four items that were covered by so-called DAC areas.

There are a lot of things to be said about that certified design material section but I don't know that we should get into it, unless we want to be here a long time. I think it's the kind of questions that the Commission ought to answer or decide on, but not the kind that we should really get involved in, since they are really non-safety questions.

Now, they could affect safety, depending on how and how well it's done. That's what Bob was trying to point out, and he's quite right. It's an area that I thought I had gotten pretty clear charter from the Committee, that we didn't want to get into this certification business, and that we were just going to review this from the viewpoint of safety which is what Part 52 asks us to do. That's as far as it went.

MR. WILSON: Mr. Chairman, let me be sure that the Committee understands that Mr. Gramm is presenting initial test program, Section 14.2. We also have a presentation by Mr. Boyce on 14.3.

MR. MICHELSON: He didn't cover 14.3, okay. We would like to hear the presentation. We might even be enlightened by it. My problem was, how far do we go on design certification. It's a sticky area, most of which it's hard to associate with safety. There's always the indirect association.

[Slides.]

MR. BOYCE: Good afternoon. I am Tom Boyce, Project Manager, Projects. I work for Dennis Crutchfield in the Division of Advanced Reactors. I have presented to Subcommittee's and full Committee, the development of the certified design material for the ABWR and the System 80 Plus.

I will keep this very short, in light of the discussion that just occurred. I won't show all of my viewgraphs.

MR. MICHELSON: As long as you put them in our hands we might ask questions anyway.

MR. BOYCE: I certainly expected that. Let me just say that Section 14.3 is a new section of both the SSAR and the FSER, in terms of what we have historically done for Part 50 licensed plants. GE provided the development methods and the selection criteria for the certified design material in their SSAR Section 14.3. The staff provided its evaluation of the process used to develop the certified design material in its FSER Section 14.3.

It's important to point out, that there's no new technical information in the staff's FSER or in GE's SSAR. It is a discussion of process. The staff's safety evaluation for the design are found in other respective sections of the FSER. What the FSER does is, provide the staff's approval of the certified design material. It's focused on the ITAAC, because Part 52 is focused on the ITAAC. Again, there's no safety evaluations.

[Slides.]

MR. BOYCE: In light of Mr. Michelson's comments, I am going to jump to my second to the last slide, where I talk about the bottom line of the FSER. Here it is. The words are derived right from 10 CFR Part 52. These are the requirements for ITAAC, and we make this conclusion.

The staff concludes that the certified design material is necessary and sufficient to provide reasonable assurance that, if the inspections, tests and analyses are performed as they are specified in the tier one material and the acceptance criteria are met, the facility referencing this design will be constructed and will operate in accordance with the design certification and applicable regulations.

Those words are derived straight from Part 52.

MR. MICHELSON: Those are the words that you have to eventually come up with. You don't give an FDA until you can make that statement.

[Slides.]

MR. BOYCE: Now, I will go to my last slide, and tell you what we are still doing. You will note, that the ACRS concerns are being addressed here. What we did, because we hadn't received your letter on the DAC yet was, open up a couple of these items in anticipation of what we thought we were going to see in the letter. We said there's one open issue, on building fire and flooding design. What that really means is the as-built fire and flood reconciliation analyses.

Mr. Michelson, I think we are ready to talk that over with you on a break, if you would like. We will show you some proposed words that GE has proposed and the staff has looked at, that we think will work.

MR. MICHELSON: Can you just give the Committee those words?

MR. BOYCE: I am not prepared with viewgraphs to do that, and I am not sure that they really need to go through that at this point.

MR. MICHELSON: These are the words that you are going to add to the ITAAC, the appropriate ITAAC?

MR. BOYCE: The appropriate building ITAAC for fires and floods. You had some comments on the piping DAC and we have also brought some words that we propose to add to the piping DAC.

MR. MICHELSON: You might tell the Committee, roughly, the content of these words.

MR. BOYCE: For this what we are proposing is to add a requirement to the appropriate building that says that the COL licensee, once the plant is built, it will use as-built data and make sure that all the preliminary analyses for fire and flooding are in fact borne out in the as-built designs, so that any deviations are reconciled with the analysis, and you prove that the plant would not be susceptible in any way to these fire and flood type of events.

MR. MICHELSON: How about the pipe break?

MR. BOYCE: The pipe break would be covered under here, under piping DAC. We called this confirmatory. his was the other item. Right after you opened up the issue GE proposed some words, and we are still debating those. This was confirmatory. Essentially, we went with your words that proposed that if you have a pipe break you would make sure that you would look at environmental effects on surrounding equipment, you make sure that containment integrity was maintained, and you could shutdown the plant in a safe shutdown.

MR. MICHELSON: And, the structures were protected.

MR. BOYCE: And, the structures were protected. Some of that was already there, so we actually wanted to come back and talk to you on it.

MR. MICHELSON: It was there for the high energy.

MR. BOYCE: Right.

MR. MICHELSON: Certain aspects of the high energy was there. It wasn't there for other aspects. I am just trying to get it all put together. It probably was intended to be there and just didn't get there on the initial cut.

MR. BOYCE: If nobody has any questions on the remainder of my slides -- it is a discussion of the development process and the basis for the staff's review of the certified design material -- that will conclude my brief.

MR. MICHELSON: The staff is coming in I guess eventually, to discuss the staff's paper on the certification process; is that right?

MR. WILSON: Could you clarify, Mr. Chairman?

MR. MICHELSON: We got a paper not too long ago -- I haven't had time to even study it and that's why I am trying to ad lib it just a bit -- we have a staff paper now on certification.

MR. EL-ZEFTAWY: Are you talking about the advanced proposed rulemaking?

MR. MICHELSON: Yes.

MR. WILSON: The ANPR that we probably showed in the Federal Register in November, the positions the staff took were consistent with what we had in SECY 92-287(a). I gave a presentation to the Committee on that sometime ago. I didn't come down to the Committee to give a further presentation, because there wasn't anything different from what I had previously said.

MR. MICHELSON: That's really what was covered by these other slides, wasn't it? Is this dealing with something else you were going to say?

MR. BOYCE: No. This is the development process for the GE certified design material. What Mr. Wilson is referring to is the design certification rule.

MR. MICHELSON: That would be the process by which we arrive at the final certified design material that goes into the rule.

MR. WILSON: There's a rule, and it references the certified design material and the so-called tier two material.

MR. MICHELSON: I don't know. Does the Committee want to hear about these other slides, or not? We have been exposed to the process more than once. It's up to the Committee, if they would like to hear it.

[No response.]

MR. MICHELSON: I think we have been told most of these things before. I think that takes care of it. It will get us back on schedule, if it does.

MR. WILSON: If the Committee is ready to move on, I would suggest that we next discuss physical security, since our staff for that presentation is here right now.

MR. MICHELSON: Okay.

MR. WILSON: Could I ask Mr. Dube to give a presentation now, please?

MR. MICHELSON: Do we have to clear the room for that one?

MR. WILSON: No, we don't.

MR. MICHELSON: Can we discuss the drawings that were sent to us?

MR. WILSON: We are ready to discuss the drawings.

MR. MICHELSON: Even though they were marked Safeguards Information and whatever. They were so well protected, I didn't even bring them with me.

MR. DUBE: Let me tell you what we did in our review and what we didn't do, and how we used those drawings. I think that when I have done that, you may find that --

MR. MICHELSON: The problem with the drawings is, I don't agree with the drawings in the rest of the SSAR. They have things added to them that are not necessarily present in the design, and particularly in the control building. It's because we got such lousy control building drawings that you guys, I think, tried to fix them. You are not allowed to do that. The drawings have to be consistent. Whatever is used in Chapter 1 is what you should be using.

MR. DUBE: Let me explain what we have done.

MR. MICHELSON: Okay.

MR. DUBE: Let me explain how we have used them previously and what we have done since the last meeting, and what we tried to do to recover from the embarrassment.

[Slides.]

MR. DUBE: My name is Bob Dube. I am Chief of the Performance Evaluation Section in the Reactor Safeguards Branch. One of the functions of my section is to do the safeguards review of all the advanced reactors.

I think that probably the most useful thing we can do in helping to address some of the questions that came up last time -- I am sorry that I wasn't here last time, I was out of town -- is to explain to you what we did in the review process, and probably equally if not more important, what we didn't do in the review process.

Historically, all of our safeguards reviews on light water reactors were done at the operating licensing stage. One of the things that we wrestled with when we first started to get into the process of looking at advanced reactors was to try to make a decision as to what portions of that review we should accelerate up to the design certification stage.

The bulk of the review that we typically have done in the past was light water reactors, we have deferred to the COL stage. The primary things that we did at this stage of the game was first of all, to evaluate GE's identification of vital equipment. We did not do an assessment of the adequacy of vital areas. In the safety evaluation report we acknowledge in there that GE's submittal identifies vital areas, but we draw no conclusions about the appropriateness of those vital areas. We did that for a couple of reasons.

One was, the drawings that GE submitted did a fair amount of compartmentalization of vital areas. The trend in the industry over the last several years has been to go to vital items and away from a high degree of compartmentalization. The second thing is, is about the time we started this review -- which was roughly three years ago -- we were initiating a process to re-evaluate all of our security requirements. We just recently sent a second paper up to the Commission, on a reconsideration of the security requirements related to an insider. We sent a copy of that paper to the ACRS several months ago, as I recall.

That paper has a direct impact on decisions that a designer would make in terms of laying out vital areas. We intentionally did not get involved in that issue. We did, however, as I said, look at vital equipment. The way the GE submittal was structured, it was necessary for us to use those drawings to confirm that their identification of vital equipment was adequate in terms of the kinds of equipment within the scope of the review.

MR. DAVIS: Excuse me. Maybe you plan to cover this, but I am sure you are aware that staff, with the Commission agreeing, has decided to proceed with rulemaking to augment security to eliminate the potential for malevolent intrusion.

MR. DUBE: I wrote that paper.

MR. DAVIS: How is this going to be captured in the ABWR design, or will it be?

MR. DUBE: It won't be captured in the design at this stage of the game. That, again, would be a site specific issue. What we are proposing there is barriers that would typically be somewhere in the vicinity of existing protected areas at existing licensed operating plants.

MR. DAVIS: The COL would have to pick this up as a requirement if in fact the rule --

MR. DUBE: Yes. Assuming that a final rule is issued, then that is something that would have to be addressed in the COL stage. It's a new requirement. Although I am not an expert on how this whole process goes, I am assuming that if the Commission publishes new rules in the future that licensee's would have to address those rules, even though it hasn't been addressed in the design certification stage. If I am wrong with that, then I have to go back and do some more work. I have been operating under that assumption.

MR. DAVIS: I hope that's right. Jerry, is there a mechanism to incorporate new rules into the design as they develop? We were just talking about this malevolent intrusion rule that is now being remanded to the rulemaking process, but it will probably be approved after the certification process is over.

MR. WILSON: If it applies to that portion of the review that is outside the scope of what we are reviewing in design certification, it will just be taken care of at the time that we do the review. So, the particular issue that Mr. Dube is talking about, we are going to do that at a combined license review stage. At that stage, we use whatever rules are applicable and in effect at that time.

If it deals with an issue that we have already completed the review of here, design certification, it wouldn't apply.

MR. DUBE: This is outside the review. Right now, we have not looked at the protected area of fence, for instance. That is not one of the things that we asked GE to address, either the location or the nature of the protected area of the fence. Basically, what we are talking about with this new rule is a different type of fence.

MR. DAVIS: We are covered on COL stuff.

MR. DUBE: Yes, we are talking about COL stuff. Let me get on to the second area that we did. Again, I think in the last presentation there was some confusion over what we did there. This is the area that we call the vulnerability analysis. Let me go back a little bit in history.

Back as early as about 1976, when the Commission was in the process of considering the publication of 10 CFR

7355 which is the basic core of the current requirements of physical security, one of the issues that was addressed -- my recollection is that the time it was addressed was in something that was written by then Commissioner Anders -- that staff encourage vendors to consider physical security in the process of designing plants, rather than simply looking at security being an add on in order to protect the plants.

The emphasis was trying to decrease the reliance on security measures, and trying to make the design itself more robust against malevolent acts.

Interest has continued in that area over the last 15 years. Generic Issue 829 identifies that as an issue. Back on September 2 -- I forget the exact year. I remember the date because it was my birthday, but I forget the exact year. It was around 1989 or so. I have that in one of the later slides. When the ACRS was reviewing the Commission's severe accident policy statement, ACRS recommended that something be put in the severe accident policy statement encouraging designers to take potential acts of sabotage into consideration in the design process.

That statement was included essentially verbatim, in the final issuance of the Commission's severe accident policy statement.

Although there has been a lot of interest expressed over the years, however, there's never been any real specific requirement that licensees do any specific things to try to address malevolent acts in the process of designing a plant.

One of the things that we did earlier in the review process was to encourage both EPRI and the various vendors that have already submitted designs to the Commission to do a vulnerability analysis of the safety design of the plant, to see if there were any simple and cost effective design changes that could be made that would help reduce the vulnerability of the plant to malevolent acts.

EPRI ended up including a requirement to that effect in their URD, and GE did an analysis similar to the one that we asked them to do.

The third thing we did -- and we did not do a lot in this area -- because of our sensitivity of wanting to make sure that whatever security measures are put in place, that those measures don't have any adverse impact on safe operation of the plant. We reviewed all of the commitments that GE made in the security area, to make sure that none of those commitments were potentially inconsistent with safe operation.

An example of one of the things that we asked them to do was to clarify in the SSAR that egress out of a vital area would not depend on use of either a key or a key card, that you would have some kind of crash card to egress out of a vital area.

MR. DAVIS: How about ingress to a vital area.

MR. DUBE: That was a little bit tougher. GE had already covered the ingress aspects of it, we felt, adequately. The egress aspects hadn't been addressed. The ingress aspects are of interest to us. It was an area where we felt that the GE submittal had to be modified It was one of the areas that we found something.

MR. MICHELSON: In the case of the ABWR, of course, we have a little bit unusual control room arrangement in that, the area where the central console and so forth is located appears to be totally divorced from the areas at each end of that same floor, where other control panels and other control equipment and so forth is located.

I wasn't sure how we defined control room and its access as opposed to these others immediately adjacent. I am not sure what's in them entirely and am not sure to what extent a person bent on doing damage could go in there and do damage, even though he never entered the control room per se. This just is unclear, and I wonder if you have taken any look at this arrangement.

MR. DUBE: I don't know whether we did or not.

MR. MICHELSON: You made some lines on the drawings that you submitted in response to 13.6. I am not sure how much thought went into it. I am trying to search for, how much did you really look at this arrangement.

MR. DUBE: In terms of the specific question on the control room, I can't provide you with an answer right now. Unfortunately, the individual that did the review for me left my section about a year and one-half ago.

MR. MICHELSON: I am also kind of wondering whether these control panel areas immediately adjacent to the control room are classified as something more important than the rest of the control building or of equal importance to the rest of the control building, and not as important as the control room.

I just couldn't see the logic in this arrangement, in which you didn't seem to help any.

MR. DUBE: I am not sure to what extent we looked at that issue.

MR. MICHELSON: What you did is, you identified the hallway going around this area as being not of -- I don't know if it's not a vital area -- it was not a controlled area. You identified the inner portion, all, as a controlled area. I didn't know what --

MR. DUBE: Again, understand that at this stage we did not try to define what areas should be identified as vital areas. What we tried to do was look at the safety equipment and to make sure that the appropriate safety systems are being protected, without worrying about the delineation of the actual vital area.

We will do that at the COL stage. I will also make sure, since you have raised that issue, that we will look at that specific issue.

MR. MICHELSON: It's not clear even from the drawings as to exactly where the doors are, since the control room building drawings were so poor that you couldn't tell when there was an opening in a wall or whether there was a door in the opening, or what.

MR. DUBE: Yes.

MR. MICHELSON: In your drawings you put some doors in some of those openings. I don't know if you knew whether there was a door there or not but you put it in anyway, because I suspected you wanted to identify tighter boundary for tighter security or something.

MR. DUBE: Again, we did not make any effort to specify what the vital area boundaries ought to be.

MR. MICHELSON: I probably read more into it than was there because you did shave the areas, and I wasn't sure what it meant.

MR. DUBE: I am not sure. We made no effort -- intentionally made no effort -- to try to define the vital area barriers. We will do that at the COL stage.

MR. MICHELSON: All right.

MR. DUBE: Within the scope of the limited review we did, we did confirm that General Electric's identification of vital equipment was consistent with our current acceptance criteria. In terms of the vulnerability analysis, we have no standard requirement. There is no magic set of criteria that a vendor has to meet.

Basically what we do is, we take a look at the analysis, to try to arrive at a conclusion that the vendor made a good faith effort to try to factor into the design process the potential of somebody trying to perform some malevolent act. Our conclusion in this case was that GE in fact did make a good faith effort, and they did identify several design changes that they made to the plant which would make it more difficult for somebody to sabotage the plant.

In the certification area, we concluded that there is nothing currently in the SSAR which would negate the ability to provide rapid egress and ingress from vital areas.

In terms of the specific questions that came up, after we recovered from the embarrassment of finding out we were working with old drawings, we obtained updated drawings from GE. We then checked those drawings with the drawings that are in Section 1, and confirmed that they were consistent. We then reviewed, again, GE's identification of vital equipment and compared that with the listing elsewhere in the SSAR of equipment that has to be protected as seismic.

Basically, when we evaluate the adequacy of the identification of vital equipment, we piggyback on the safety review. Anything that has to be protected as seismic, we assume should also be protected as vital. Again, to the extent that we could with the level of detail in the SSAR, we confirmed that the listing of vital equipment was consistent with the identification of equipment and systems that have to be protected as vital.

Finally, what we did to try to trace the systems down in more detail, was to take a look at the fire safety analysis which provided more detailed information on the location of components at various safety systems, and confirmed that everything that we identified in looking at the seismic stuff and then looked at the graded detail by looking at the fire safety analysis, fell into the framework of things that GE identified as being vital.

The second question involved the fact that we had asked GE to do a vulnerability analysis. Again, I think there may have been some confusion over what that vulnerability analysis was. We recognize that it's not a requirement. EPRI now does have it as part of their URD.

To the extent to which a vendor meets EPRI's URD, they are required now to do a vulnerability analysis.

We have no specific criteria that anybody has to meet. We simply want to make sure that people start thinking early in the game about the possibility of malevolent acts when they are doing the design.

Finally, in the ITAAC area, our primary focus was on identification of vital equipment. All of that equipment is safety related equipment. There are safety related ITAAC's that deal with that equipment. We couldn't identify anything else that we would want to do beyond that.

We have put a provision in to make sure that the COL applicant commits to doing a confirmation 60 days before loading fuel, that all of the security systems and programs prescribed are in place and functioning properly. That's basically a standard condition that we have been putting in the licenses for the ALWF's. We have simply lifted that standard condition and put it in as a COL item.

That's basically all I have. If anybody has any additional questions, I will answer them. How about the issue of the drawings. Do you feel more comfortable now, in terms of the drawing thing?

MR. MICHELSON: I looked at your drawings. I don't have them with me. You have added some things to them, I think, because you didn't know what was there. You speculated, and put down on your drawing what you thought was there, like doors and so forth, which don't show up clearly in the control building drawing. You put them in.

MR. DUBE: In our drawings or GE's drawings?

MR. MICHELSON: These are marked up. The security drawings have been marked.

MR. DUBE: They were marked up by GE.

MR. MICHELSON: GE marked them up. Whoever, they were marked up. GE put them in, where they don't reflect the same things as said in Chapter 1 drawings in all cases.

The question I have though is, this plan involves some rather extensive tunneling between vital areas. They have tunnels going from the reactor building to the rad waste building, from the turbine building to the reactor building and off to the rad waste building.

Have you looked at the security aspects of any of these tunnels?

MR. DUBE: Not at this stage of the game. Again, we have not asked the licensee at this stage -- actually, I didn't --

MR. MICHELSON: I didn't find it identified or discussed in your report. Certainly, they need to be considered.

MR. DUBE: I just realized that I left out one of my slides. One of the slides talks about the fact that the physical security plan, the contingency plan --

MR. WILSON: Slide three.

MR. DUBE: And the training plan, have all been deferred to COL items. Again, the bulk of the review that we would normally do will be done at the COL stage.

MR. MICHELSON: So right now, all you did was look at it enough to say that we seem to have a proposed layout, and as far as you can tell, there's no problem with what's there. What you looked at though, did not include those tunnels.

MR. DUBE: No. We did not look at tunnels nor did we look at location of fences, nor did we look at locations of doors. We did not look at location of the alarm stations. Essentially, the bulk of the review that we would normally do has been identified as COL action items.

MR. MICHELSON: Any questions from the members?

[No response.]

MR. MICHELSON: Seeing none, I believe that completes that item. Thank you.

MR. DUBE: Thank you.

MR. WILSON: Mr. Chairman, we have two remaining presentations, one on technical specifications, Chapter 16, and another one on generic issues, Chapter 20. If the Committee wants we can do those after the break, or whichever you prefer.

MR. MICHELSON: The tech specs fellow is not here either. I guess we need to hear whatever you have to say. Why don't we just take a quick break then, until five after three. Then, we will finish up with you.

MR. WILSON: All right.

MR. MICHELSON: Thank you. We will break until five after.

[Brief recess.]

MR. WILSON: Our first speaker, Mr. Chairman, will be Mr. Reinhart. He will speak on review of Chapter 16.

[Slides.]

MR. REINHART: Good afternoon. My name is Mark Reinhart. I am with the Technical Specifications Branch of NRR, and oversaw the development of the ABWR technical specifications.

Section 16 of the SER addressed the technical specifications. When we originally submitted that in November of 1993 until now, there have been no issues that have caused the SER to change. The SER basically explained that the improved BWR standard technical specifications were used as an input for the ABWR design. We verified the portions that were not changed from the standard, we verified the appropriateness of those, and we focused our review on the changes from this standard. We have been in technical agreement with GE for some time on those issues.

We did do an audit which was planned. We had an independent audit of the ABWR technical specifications, the results of which were presented on January 14. The audit took place late December, early January. At the same time, the special inspection branch of NRR performed an ABWR ITAAC independent audit, and had a few issues that addressed technical specifications. Also, the technical branch's review of the SSAR including tech specs, provided some input.

Those combined results of the audit resulted in fewer than about 100 comments. There were 80-some comments. There were no new issues involved. I would say the most significant were GE needed to improve their explanation and the bases, where risk analyses or risk sensitivity was used as a basis for some of the relaxations. We talked to GE, and they are aware of that. The majority of the comments, I anticipate, will be resolved internally to the staff. We have some typographical, editorial clarifications and some bases clarifications.

Our goal that we expect to meet is to resolve those issues by early February of 1994.

MR. DAVIS: Did you try to discourage the use of risk as the basis for improving the tech specs, or just question the methodology?

MR. REINHART: Did you say, did we discourage it?

MR. DAVIS: Did you try to discourage the use of risk?

MR. REINHART: No, sir. We encouraged that.

MR. DAVIS: Okay, good.

MR. REINHART: We encouraged that, and we got about eight significant relaxations in the ECCS, RHR, RCW, RSW area.

MR. DAVIS: Thank you.

MR. REINHART: Two questions that the ACRS asked the last time we were here, I thought I would return and let you know what we did there. There was a question on RHR suppression pool cooling, which was LCO 3.6.2.3. The question focused on the allowance of two of the three trains being inoperable for three days, and whether that was appropriate.

When we left the meeting we thought that was okay, based on some input from GE. We said we would get back if we change that. In discussing it further with GE, it turned out that the three trains were not 100 percent trains. They were something like, I am going to say 65 to 66 percent trains. We removed the condition and the completion time that allowed two trains to be inoperable, and operation con inue for three days. The staff and GE is comfortable with that specification.

Another specification that was discussed was LCO

3.5.1 ECCS operating --

MR. SEALE: You mean, that each of the three trains was not 100 percent capable?

MR. REINHART: That's correct.

MR. SEALE: The way it's worded --

MR. REINHART: I say each of the trains, I am going to say, is about two-thirds. The LCO on ECCS operating, we focused on ADS valves. Based on the comment we asked the auditors to take a look at that spec and we took a look at the spec, and found it could have been a typographical error in the translation from the proof and review markup to the final spec. There was an incorrect -- it should have said and condition C, and it said condition E, which allowed ADS valves and high pressure pumps to be at a reduced operating capability. We corrected that mistake.

With those two issues, we believe we have addressed the questions the ACRS has brought up, as well as questions brought up by the staff. We have resolved those, or are in the process of nearly resolving those with GE.

MR. POWER: This is John Power, from GE. I would be remiss of not making a comment relative to the RHR suppression pool cooling. As we discussed the last time we were here relative to the operation with an elevated pool temperature, we would say that one RHR would be sufficient under most cases to be able to operate and perform the function that we intended it for.

One of the open items with the NRC and at the current time with the staff is, relative to us providing information that would take into account an elevation of the pool temperature, from 191 up to some value like 237. We are in the process of doing that. Our expectation is to justify operation with those kind of saturated conditions on those pumps and to operate that.

MR. MICHELSON: Do you have enough NPSH in the pumps?

MR. POWER: Yes, sir, we do.

MR. MICHELSON: Assuming you lose the primary containment?

MR. POWER: Yes, sir, we do.

MR. MICHELSON: What are you, pumping boiling water?

MR. POWER: We are going to be --

MR. MICHELSON: It's going to be boiling as soon as you crack the containment, at 237.

MR. POWER: That's correct.

MR. MICHELSON: You are going to have bubbles throughout the liquid.

MR. POWER: That's correct. When our analysis comes in we will be discussing what that pool temperature is at the strainers, in the pool, et cetera.

MR. MICHELSON: At the suction of the pump, where the problem is.

MR. POWER: That's correct.

MR. REINHART: You are saying that GE proposes to change that --

MR. POWER: What I am saying is, the tech spec people at this time are negotiating a closure on an item that may be impacted by other items that are under further discussion. We are not trying to say that that's an unacceptable negotiated settlement. What we are saying is, we see that the RHR pumps are capable of operating with an elevated pool temperature, and we are in the process of discussing and providing an analysis to the staff relative to elevated pool temperature. That's all I am saying.

MR. SEALE: There may be more margin there than you thought.

MR. POWER: We think there is.

MR. MICHELSON: Let me make sure that we understand each other. You are going to do the analysis, assuming that there's only atmospheric pressure over the pool at the time you are pumping 237 degree water.

MR. POWER: Yes and no. There is a reg guide, 1.1, that tells you that for the design basis of the plant, et cetera. Some of these events we are talking about -- and things are starting to leave the deterministic safety domain and becoming more and more into what I would call the beyond design basis in severe accident aspects -- like assumptions associated with pool temperatures prior to the events, et cetera.

We will be providing an analysis to you, to modify this understanding that currently is there, at some time in the near future.

MR. MICHELSON: Right now, you probably can't make it even at 210 degrees.

MR. POWER: No.

MR. MICHELSON: It will be that there's only one atmosphere on top of the pool.

MR. POWER: No. What I would like to do is to be able to address that item for you in writing.

MR. MICHELSON: You can do it that way. You are going to put one atmosphere on top of the pool, you are going to be hard pressed to pump boiling water. You have plenty of MGSA, as long as you keep the vapor pressure of the fluid also be added to the atmosphere above the fluid. Then, you have no problem. It's easy to pump then.

MR. COSTNER: Mr. Chairman, will this analysis also include the effect on the relief valve in the RCIC tail pipes.

MR. MICHELSON: I don't know.

MR. POWER: That's basically what some of the consideration is. There is a creation that's an enlarged bubble effect into the thing. The concern is that if those bubbles could collapse, would they have an effect on the drywell integrity or wetwell integrity itself, in addition to the concerns about pumping fluid.

MR. MICHELSON: You might also look to see how good data you have on your strainers when you are starting to pump water with high void fraction in it.

MR. POWER: That happens to be another item which is also under discussion, and which we are evaluating and providing that.

MR. MICHELSON: When you get all done I would like to see this before we write off on it.

MR. DAVIS: But, you don't need three 100 percent trains for any licensing requirements.

MR. POWER: Do not need three.

MR. DAVIS: It's just a --

MR. POWER: It certainly becomes one of putting in a three divisional system and having a one small window of coincidence negate the full utilization of those three, to allow maybe on line maintenance of one of those pumps that might take more than three days without getting into limited condition operation, testing and all those other things.

MR. DAVIS: I guess what I am trying to get at is, even if your analysis is not accepted that's no big problem.

You will just revert back to the tech spec change that the staff is recommending.

MR. POWER: That's correct.

MR. DAVIS: You meet all the requirements.

MR. POWER: Yes.

MR. DAVIS: Thank you.

MR. REINHART: The change that we talk about is the current amendment 33. The current amendment 33 tech spec is acceptable to the staff. This would be a future proposed change.

MR. DAVIS: Thank you.

MR. MICHELSON: What does it provide for? What does it require?

MR. REINHART: The current tech specs?

MR. MICHELSON: The current one.

MR. REINHART: The current tech specs allow one RHR to be out of service, but when you get two trains out you go into control shutdown.

MR. MICHELSON: You come down, okay.

MR. REINHART: Are there any other questions?

[No response.]

MR. REINHART: Thank you.

MR. WILSON: Mr. Chairman, that brings us to our final planned presentation today, Chapter 20, on generic issues. Ms. Malloy is going to give that presentation. I would note that she has gotten out of her sick bed to be here today, so I would request that the Committee show a litt - mercy.

MR. MICHELSON: I think we kind of beat this subject to death sometime back.

MR. WILSON: We just wanted to be sure that you had a chance to understand how we have disposed of it in the SER.

MR. MICHELSON: I don't think this is a difficult issue.

[Slides.]

MS. MALLOY: With that wonderful introduction from Jerry, I really wasn't looking for any sympathy. I am feeling much better. I lost a lot of sleep, worrying about coming to the ACRS meeting and needed to catch up on it. We can cover this area very quickly, I think. We last briefed you on our methodology for the review back in September. In early December, we sent you our advanced copy of the Chapter 20, which covers other than USI's and GSI's. It also covers 50.34(f) compliance as well as has a discussion on treatment of generic communications for the ABWR design.

Since that was sent to you, we had to make some updates and changes to the Chapter, to put it in a form that was issuable by the end of December, with the rest of the FSER. I have listed those there, in the third bullet.

Most notable of the missing tables, there were to be tables in there which identified which issues we reviewed for specific compliance with 52.47 requirements. Those were missing from your advanced copy. They are in the FSER at this present time.

Also, in my last starred item I show several issues for which we did change the evaluations based on staff review and comments. I guess if you are interested, you would find if you compared the two, that you would see some not substantive differences but in appearance the length and content you will find some differences in the discussions for those several issues.

[Slides.]

MS. MALLOY: My next slide shows that we still have additional work to do in Chapter 20, given that we worked on such an accelerated schedule to try to get Chapter 20 done. We were very far behind everybody else in getting the work done. We still have not incorporated OGC comments and technical editor comments. Unfortunately, DSSA's comments were not incorporated into the most recent version of Chapter 20, and we will be working to do that here over the next several weeks.

The FSER, as of the end of December, had one open item related to the diversity issue for reactor vessel level reactor instrumentation as well as two missing COL action items. They were identified in the DFSER and GE had not picked them up in their SAR material. In addition, we have done our review of Amendment 33, and negotiations on several of the issues ran very close to cutoff time for that amendment. In the next amendment GE has to actually provide changes that were agreed to for several issues. We expect to see that in the next amendment.

That's all I had to discuss with you on Chapter 20. If you have any questions, we will be glad to help you answer them.

MR. MICHELSON: The last time that we discussed Chapter 20 there was a significant amount of discussion concerning A-17 systems interaction. You pointed out, of course, the ACRS did not accept the staff's resolution of A-17 because it did not answer a significant number of issues, which were then relegated to a so-called multiple system response program -- I don't think it's dead necessarily, but I am not sure it's kicking very much.

We simply haven't addressed A-17. There is no recognition in this addressing that there is anything to be done, other than the resolution. Maybe that's -- the resolution didn't do much. It was a small part of the problem. It was the only part of the problem you knew what to do with. You said it's resolved, but the problem is going to be in the multiple system response program, where we are going to prioritize five areas. We were going to decide how to go from there.

This is years ago that this happened, four years ago. I don't know whether the Committee wants to do anything about it for ABWR or not. I have no strong feelings either way. I think the issue is very real. I think its problems on ABWR are very real, but I don't know how to tackle it. The staff resolved the issue already, except that they only resolved a little piece of it. ACRS was sufficiently displeased with what they did. They said, we don't even accept this. Here is what has to be done.

We have not even accepted the resolution of A-17 at this stage of the game. I don't know whether we want to create a fuss over it or what. It's a Committee decision, not a staff decision. I just want to point out for the Committee that A-17 was not really covered.

MR. DAVIS: I think that Jay Carroll had some real concerns about that, and I thought he was going to prepare something.

MR. MICHELSON: I thought he was going to be here.

MR. DAVIS: Yes, I did, too. I think he was going to prepare something for us to look at.

MR. MICHELSON: Yes. Whether we put anything in our report on ABWR, I don't know. I just wanted to refresh the Committee's memory on this, and also just point out to the staff that we haven't bought off on A-17, nor do we necessarily buy off on it that the ABWR has appropriately addressed the issue. I just don't know where the Committee is going to be.

MS. MALLOY: My recollection from the September meeting was that what Mr. Carroll was going to do was to prepare some appropriate ACRS correspondence, which would then go back to our office of research to address the concerns. We tried to deal with A-17, and there is a write up in the FSER that is very general in nature. It's in Section 20.1.7.

MR. MICHELSON: It did not give recognition to the fact that the ACRS did not buy off on it.

MS. MALLOY: No, we did not.

MR. MICHELSON: It didn't even mention it. It read just like all the others, like it's all done and resolved, and what GE has done is acceptable.

MS. MALLOY: Right.

MR. WILSON: As the Committee knows, NRR's responsibility here is to review how GE has addressed the resolution of those issues. The Office of Research is responsible for the resolution of the particular generic issues.

MR. MICHELSON: This issue hasn't really been resolved, unless you claim that it is resolved even though the ACRS pointed out what are really significant deficiencies in the resolution.

MR. WILSON: I was just clarifying, that the disagreement is between ACRS and Office of Research.

MS. MALLOY: The issue was officially resolved without the establishment of requirements, as we discussed before.

MR. MICHELSON: I don't have a strong feeling on it. Jay and others may, and I just don't know where the Committee wants to come out on it yet.

MR. POWER: Mr. Chairman, when that subject came up by Jay in Portland, we submitted two responses. The first one was what we currently perceive is the problem, and a program aspect of redoing the NUREG that the staff had put out for resolution of the issue.

Secondly, after that, we went back and pulled out more additional information, significant amounts of information from industry groups, previous work that had been done on all kinds of things like diagraphics. We went over this thing in general and put together a presentation for it with the information, and we submitted that two meetings ago.

In essence it says that since the time that system interactions was in its infancy, back in 1983, a great deal of analysis has occurred across the board, PRA analysis, fault trees, event trees, significant amount of operating experience data has been fed back into the system in an organized sense. A great deal of operator action and operator error and aspects have been incorporated.

A lot of diversity and system interactions that have been advertised in 20-some years of plant operation have been compiled and put together and written down. I guess our response to that is, we believe that was our checklist, going through and identifying and looking at and evaluating the BWR relative to system interactions. That was our response relative to the ABWR.

Again, if there is more to be done beyond that, I guess we are not aware of what that would be.

MR. MICHELSON: I was only trying to point out that I didn't know where the Committee might come down on this issue, since I haven't seen what Jay is going to write yet.

MR. DAVIS: I have a few questions on Section 20, Mr. Chairman.

MR. MICHELSON: Sure, go ahead.

MR. DAVIS: It shouldn't take very long. First of all, I thought you did a very good job in Section 20 of addressing the USI's and GSI's. However, there were a couple of places where I had some problems. One of them was on page 20-95. This is more of a general problem, I guess, than just what is stated here.

Originally, GE had actually done a seismic PRA as part of their overall PRA. Then, for reasons I am not clear on, they decided to instead take that out and substitute a seismic margins assessment. It turned out that in the original PRA the seismic contribution to risk was about ten times what just the internal events risk was.

The problem comes up when GE uses the internal events risk to do an analysis of the cost benefit of adding safety improvements to the plant. In fact, as is shown in Section 20 at the end, there is nothing that even comes close to being justified on the basis of risk improvement. I think that's a little bit misleading, because they have left the seismic and fire contributions out of the risk assessment.

You acknowledge this on page 20-95, but I have a little trouble with your statement. Your statement is that the reduced risk when seismic was taken out further strengthened GE's original conclusion that no additional design improvements were cost beneficial. Indeed, when you take out seismic the numbers do go down. I think that actually weakens their position. What they have done is eliminated a major contribution to risk and then redid the numbers, showing that nothing is cost beneficial.

I think that you can make the case that if you put seismic back in you are not going to drive anything back up even being close to cost beneficial. If you will bear with me, the staff also states that when they use the MAX code for the Zion site and used a MELCOR for the source term calculations, you got much higher source terms for those accident sequences which result in containment venting.

What I am getting to is my own personal feeling, that it would be useful to put a vent system on the containment over pressure protection system. GE's analysis shows that it's not cost beneficial. But if you add the seismic in, add the increase source term that the staff calculates for those sequences -- and I don't know how much of an increase that is because it doesn't say in Section 20 -- I begin to wonder if the numbers are going to change enough that you might come to the conclusion that it could be cost beneficial.

Have you looked at that issue specifically?

MR. POSLUSNY: I would like to recommend that we bring our man that worked on this tomorrow to address this. Maybe GE could talk to their folks back at home as well.

MR. DAVIS: Your overall estimate of risk was in fact five times greater than GE's, as is stated in Section 20. Plus, it looks like a risk would be shifted more towards the containment vent sequences. Then, if you add fire and seismic in, I think you are going to get a rather large factor of increase in the cost of man rem, although you have a long way to go before you can show that you could justify the filtered vent on that basis.

GE's estimate for the filter vent, as you may recall, is $3 million. I don't think that includes a consideration of using the existing filtration system in the standby gas treatment system. Is that a worthwhile consideration, or are those filters inadequate for that kind of purpose?

MR. POWER: I think we are going to have to go back home and get you an answer tomorrow. That's a good question.

MR. MICHELSON: Is that system designed for the kinds of pressures you have to tolerate --

MR. EHLERT: No, that would be the main problem. It's not designed for the 90 psi that you are going to get to then.

MS. MALLOY: The PM who worked on this issue had another meeting to attend and couldn't come here today, but we can get him here tomorrow.

MR. DAVIS: This is just a clarification. On page 20-65 you make the statement that in response to the staff's concern the BWR Owner's Group performed further studies to determine the consequences of the ABWR design regarding radioactive offsite release. Do you recall what that was performed in response to?

MS. MALLOY: Are you looking at issue -- which issue are you looking at, page 65?

MR. DAVIS: Yes. It's related to the source term, more realistic source term assumptions.

MS. MALLOY: Keep in mind that a lot of what we did in the first paragraphs of this discussion is basically ferret back some of the material that is in NUREG 0933. I don't have any personal knowledge in order to answer the question.

MR. DAVIS: Just a couple more. On page 20-99 there is a discussion of adding a fourth service water pump. I think these are all typos.

MS. MALLOY: Could be.

MR. DAVIS: There's a bunch of question marks after each statement, and I can't tell whether the staff isn't sure about the statement or whether the question mark -- you might want to take a look at that.

MS. MALLOY: Are you talking about the older version that you looked at?

MR. DAVIS: December, 1993.

MS. MALLOY: The December, 1993, I don't think there should be any question marks.

MR. MICHELSON: The one you just issued.

MS. MALLOY: I see. You are saying there's a fourth in there. I wonder where that came from.

MR. DAVIS: Like I said, I couldn't tell whether you were --

MR. MICHELSON: There's a question mark at the end of it.

MS. MALLOY: Yes, I see it.

MR. DAVIS: There are three question marks there that don't belong, unless in fact you are not sure of what you are stating.

MS. MALLOY: I think what happened was that in our original copy we had things that needed verification by various staff members. In the process of editing that for publication we missed some of those. They were intended to be taken out. That's in Dino's presentation as well. That's the same issue.

MR. MICHELSON: When we looked at the draft SER and we made a number of comments about typographical errors and just plain errors and whatever, I assume all that has been cleaned up. I didn't go back and check to see if you had changed it.

MS. MALLOY: Yes.

MR. MICHELSON: I assume that you have.

MS. MALLOY: We were under a lot of pressure to get an advanced copy out as soon as possible, and we were really working to an extremely tight schedule. We felt it was better to issue the advanced copy with all of the missing titles and everything, with the exception of some of the things you are pointing out.

MR. DAVIS: I found it remarkably free of typos, actually.

MS. MALLOY: Thank you.

MR. MICHELSON: This is an advanced copy, though, which is only going to be amended by page substitutions. This is really virtually a final copy unless they find an error on a page; is that right?

MS. MALLOY: Chapter 20, I think, might be a little different.

MR. WILSON: As I said this morning though, we are doing the review with the tech editors right now. There's a review priority. A lot of that type of editorial work, we are going to finish before the final SER is issued. In terms of the open items we are going to give you page inserts to deal with the open item resolutions.

MR. MICHELSON: Not with the typos.

MR. WILSON: That's correct.

MR. MICHELSON: The typos come after.

MR. WILSON: We won't be able to get that done to support your next meeting.

MR. MICHELSON: All right. You did make a list of the things that we pointed out that were wrong, typos and certain other areas. Remember, the elevation on the tunnels is all wrong and things of that sort. I assume that all got scrubbed into some final version. I didn't even bother to check. I was confident that it was taken care of.

MS. MALLOY: If you have found other typos in Chapter 20, we would like to know about them. We still have that major editorial revision to do.

MR. MICHELSON: I got my copy on Saturday morning, so I didn't have much time to read it.

MR. DAVIS: There's one on page 20-102, and that's the only other one that I came across -- in the second paragraph.

MS. MALLOY: All right.

MR. DAVIS: I have one final question. There are several items in here related to post-TMI requirements, having to do with small breaks in vent lines. In particular, there's one on page 20-117. In each case that I saw GE did not in fact look at breaks in these lines but rather made the argument that the main steam line break was a bounding break that would satisfy the requirements for looking at these other smaller line breaks.

The staff has apparently accepted that position.

MS. MALLOY: Yes.

MR. DAVIS: It may be valid, but it seems to me like some of these vent lines may be more troublesome problems than a main steam line break. If they are small the system remains at high pressure, and you have actually less opportunity for ECC injection systems in some cases maybe, because the system is maintained at higher pressure. In some cases the vent lines themselves, like the RCIC line, may in fact disable one of the systems that you are depending on to provide core cooling for the break.

I don't know if this has all been taken care of in other analyses or whether it really needs to be looked at in more detail.

MS. MALLOY: This would be a --

MR. WILSON: If you like, we could bring our reactor systems reviewer in tomorrow and have him speak to that with you.

MR. DAVIS: I don't know if there's time to do that, Mr. Chairman. If he could just make a statement about it, I would be satisfied.

MR. MICHELSON: We aren't talking about very much time, are we?

MR. DAVIS: No. I wouldn't think so.

MR. WILSON: We will talk to him and he will come tomorrow.

MR. DAVIS: Okay, thank you. That will be fine. That's all I had, Mr. Chairman. Again, I think this Chapter is well done, and I agree with most of the conclusions.

MR. MICHELSON: If there's nothing else on this Chapter, what was next?

MS. MALLOY: That's it.

MR. WILSON: That was all.

MR. MICHELSON: Let me take a moment to look up what I am trying to look up here.

MR. DAVIS: By the way, when is this reactor vessel water level diversity issue going to be resolved? It has been on the books a while now. Is there some way you are going to close it?

MR. WILSON: Yes. We have sent a paper up to the Commission and the Committee has sent a letter to the Commission, and we are awaiting an answer from the Commission on this.

MR. DAVIS: When do you expect to get that?

MR. WILSON: When you meet with the Commission in February, I encourage you to ask them.

MR. MICHELSON: I have a general question. I don't know if the staff wants to answer or GE, but it's back on Chapter 1. In Chapter 1 there is a table, 1.8-22, that tabulates in great detail a whole lot of experience that we have had with ABWR's. It includes bulletins, IE information notices, things of that sort.

What is the purpose of this table, and to what extent is it somehow conveying requirements, if any?

MR. WILSON: Our evaluation of the experience is in Section 20.6 of the SER. Basically, what we wanted is for GE to go back and look at generic letters and bulletins and things like that, that had operating experience, and be sure that those were factored into the design. We evaluated that in 20.6 of the SER.

MR. MICHELSON: It goes through every generic letter or a whole lot of generic letters. Does that mean that whatever was stated in the generic letter as a requirement is going to be a requirement for ABWR? Is that an inference that I can get from the presence of this table in a design document?

MR. WILSON: No. I think you should look at that as, this is information that was looked at by GE and the staff in doing the review of the ABWR.

MR. MICHELSON: But they may or may not have done anything about it.

MR. WILSON: That's correct.

MR. MICHELSON: Where does it say clearly that that is the case?

MR. WILSON: At 20.6 in the SER.

MR. MICHELSON: Somehow, it's not related to Chapter 1, where the table is. I would think that those cautionary words --

MR. WILSON: I think if you look at 20.6, it will refer back to it.

MR. MICHELSON: Let me read what it says in Chapter 1. It says, the experience information to be addressed by the COL applicant are indicated in a comment column of table 1.8-22 as COL applicant. Some things are indicated as COL applicants and some are not. The inference might be that if it wasn't indicated as COL applicant, that GE took care of it. Another inference is that nobody needs to take care of it.

MR. WILSON: As the Committee knows, these generic letters, some of them apply to design information and some of them apply to things that were within the sphere of responsibility of licensee. It may be that in some cases GE couldn't address that and an applicant for a combined license would have to address it. It depends on what the issue is.

MR. MICHELSON: Does that mean that the applicant then must go back then and address each one of these items in table 21.8-22 that is indicated COL applicant?

MR. WILSON: Yes.

MR. MICHELSON: I thought all of these things were being addressed now by GE, and only where it had to be delayed was it put on the COL applicant. This is a whole litany of information notices and bulletins, and so forth. It's an interesting list, but I didn't know what it had to do with the design.

I was wondering, maybe it's conveying a design requirement, that the designer meet whatever was said in each of these and has taken care of the problems exemplified in each of these. Information notices, first of all, don't even go out for action. They just go out for information. You don't have to do anything with them. Here, they are in this listing, and what does that mean?

MR. WILSON: As I said, the staff addressed how we used this in our 20.6. We also address that table.

MR. MICHELSON: I have to read it. Where is Chapter 20.

MR. WILSON: If you look at --

MR. DAVIS: One thirty-three is the page number, Carl.

MR. MICHELSON: I thought he meant SSAR.

MR. WILSON: If you look on page 20-134, the second full paragraph, we address that.

MR. MICHELSON: All this seems to be saying is that the staff has reviewed the design against these various bulletins and information notices. Is there more to be read into it than that?

MR. POSLUSNY: Basically, the staff did a screening of generic issue bulletins, issue notices, et cetera.

MR. MICHELSON: Why is this table in the SSAR? It's in there because somehow it's conveying now, a design or other kind of requirement. I didn't know whether there was any requirement, any intention to convey a requirement with this table. It's good information, and I am sure the staff looked at all these things when they did this review. Why is the table in here?

MR. POSLUSNY: GE basically kept a running record of the available regulatory documents.

MR. MICHELSON: This is not in your document, this is in GE's document.

MR. POSLUSNY: Yes.

MR. MICHELSON: With the statement that the experience information to be addressed by the COL applicant are indicated here. Then, the COL applicant is on a whole lot of things, including lots of information notices.

MR. SEALE: Isn't this just a way of carrying forward these particular documents as a part of the record?

MR. MICHELSON: If it's a part of the record, it's somehow inferred as a requirement then. It's not clear to me that information notices have ever been a requirement. Why are they are requirement in this case?

MR. WILSON: Part of the guidance from the Commission to the staff on doing these certification reviews, was to take into account operating experience.

MR. MICHELSON: It's GE and the COL applicant that is going to have to worry about this. I was just curious as to what the table was trying to convey in terms of requirements. It appears that it is a requirement for the COL holder to try to go through and address each of these information notices, even though it's not a requirement for present licensees to address information notices. It can be done. I think it's a policy change. The policy has been that you never had to address information notices. I think that's the policy.

MR. DAVIS: Maybe we should give them credit for doing more than necessary.

MR. MICHELSON: I guess I shouldn't even raise the issue. I just couldn't understand it. I couldn't see it under SECY 016 considerations, that henceforth we will ask the designer to design based on the information notices as well. That's the only comment that I have.

Does anybody else have anything else?

[No response.]

MR. MICHELSON: We appear to be finished for today. Let me use a tad of the time to discuss -- I think we are finished with the record now. I don't believe anything else needs to be put on the record for today.

[Whereupon, at 3:52 p.m., the transcribed portion of the Subcommittee meeting concluded.]

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission
in the matter of:

NAME OF PROCEEDING: ACRS ABWR

DOCKET NUMBER:

PLACE OF PROCEEDING: Bethesda, MD

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Michael Paulus

Official Reporter
Ann Riley & Associates, Ltd.

ABWR FSER CHAPTER 20

ACRS ABWR Subcommittee Meeting
January 25, 1994

- Last briefed ACRS on the progress of FSER Chapter 20 on 9/8/93. Discussed approach & methodology of USI-GSI review and several issues of ACRS interest

- Advanced Copy of Chapter 20 provided to ACRS for review on 12/8/93. Chapter 20 covers USIs, GSIs, 50.34(f) items, & generic communications

- Advanced Copy of Chapter 20 was updated & issued with Advance FSER in late December 1993. This version of Chapter 20 included:

  * Missing tables, titles, dates, references

  * Documentation of an open item and two COL action items

  * Revisions to evaluations of several issues

Issue	FSER Section
A-25	20.1.9
A-35	20.1.12
A-47	20.1.18
75	20.2.10
87	20.2.15
105	20.2.19

ABWR FSER CHAPTER 20

ACRS ABWR Subcommittee Meeting
January 25, 1994

- Chapter 20 in Advance FSER does not include OGC, editor, and DSSA comments and implementation of dual units of measure

- FSER status:

  * DFSER Open Item 20.3-8 (II.F.2, Identification of and Recovery from Conditions Leading to ICC) remains open until Rx vessel level instrumentation diversity issue is resolved (awaiting Commission direction)

  * DFSER COL Action Item 20.3-1 (II.B.1, RCS Vents) remains open until action item is incorporated in SSAR

  * DFSER COL Action Item 20.3.1-4 [II.K.3(15), Modify Break Detection Logic to Prevent Spurious Isolation of HPCI and RCIC Systems] remains open until action item is incorporated in SSAR

ACRS BRIEFING

TECHNICAL SPECIFICATIONS

ADVANCED BOILING WATER REACTOR DESIGN

Mark Reinhart

January 25, 1994

SER SECTION 16

- Issued November 2, 1993.

- No significant changes.

AUDIT AND REVIEW

- Independent ABWR Technical Specifications Audit complete Jan 14.
- Special Inspection Branch ABWR ITAAC Independent Review draft comments received Jan 14.
- Technical Branches' ABWR SSAR review received Jan 14-21.
- Combined findings estimate.
  - Fewer than 100 comments.
  - No new issues.
  - Improve Bases for risk supported relaxations.
  - Majority should be resolved internally to the staff.
  - Typographical, editorial, clarifications, Bases.
  - Goal: Resolve with staff and GE by early Feb.

PRIOR ACRS COMMENTS

- LCO 3.6.2.3 RHR Suppression Pool Cooling.
  - Committed to review.
  - Three trains not 100% capable.
  - Eliminated Completion Time for two inoperable trains.

- LCO 3.5.1 ECCS Operating.
  - ACRS interest.
  - Subtle difference from proof and review.
  - Eliminated inadvertent allowance for concurrent ADS and HP pump inoperabilities.

Status of Staff Evaluation

- FSER Section 14.2 Completed
- All Design Certification Open Issues Resolved
- GE Enhanced Test Abstract Prerequisites and Acceptance Criteria Information

GE ABWR FSER for Chapter 14

- Section 14.1, PSAR Information
- Section 14.2, Initial Plant Test Programs
- Section 14.3, Certified Design Material

PRESENTATION TO THE ACRS
JANUARY 25, 1994

SUBJECT: FSER SECTION 14.3: CERTIFIED DESIGN MATERIAL/ITAAC

PRESENTER: THOMAS H. BOYCE, PDST

FSER SECTION 14.3: CDM/ITAAC

- GE PROVIDED DEVELOPMENT METHODS AND SELECTION CRITERIA FOR CDM IN SSAR SECTION 14.3

- FIRST TIME REVIEW OF CDM/ITAAC; NEW FSER SECTION 14.3 CREATED

- STAFF'S SAFETY EVALUATIONS FOR DESIGN ARE IN APPROPRIATE SECTIONS OF FSER

- FSER SECTION 14.3 PROVIDES STAFF APPROVAL OF CDM, FOCUSED ON ITAAC, NO SAFETY EVALUATIONS

TIER 1 CERTIFIED DESIGN MATERIAL (CDM)

- SECTION 1: INTRODUCTION AND GENERAL PROVISIONS
- SECTION 2: SYSTEM DESIGN DESCRIPTIONS, FIGURES, AND ITAAC
- SECTION 3: ADDITIONAL DD AND ITAAC (DAC)
- SECTION 4: INTERFACE REQUIREMENTS
- SECTION 5: SITE PARAMETERS
- GE PROVIDED DEVELOPMENT METHODS AND SELECTION CRITERIA FOR EACH CDM SECTION IN SSAR SECTION 14.3; ROADMAPS CITED AS EXAMPLES

BASES FOR REVIEW OF CDM

- REQUIREMENT FOR ITAAC IN 10 CFR 52.47 & 52.97

- FIRST TIME DEVELOPMENT AND REVIEW OF CDM/ITAAC

- SRM ON 90-377, "RQMTS FOR DC UNDER 10 CFR 52" - 2/15/91

  - GRADED APPROACH FOR APPLICATION BASED ON SAFETY SIGNIFICANCE

  - ITAAC CONFIRM DESIGN, AND ARE NOT BASIS FOR SAFETY DECISION

- MULTIPLE ITERATIONS & SENIOR MANAGEMENT MEETINGS 1991-93

- COMMISSION INFORMED OF PROGRESS IN 7 SECYS ON ITAAC/DAC

REVIEW APPROACH FOR CDM/ITAAC

- MULTIDISCIPLINARY TEAM REVIEW APPROACH ADOPTED BECAUSE CDM IS BASED ON ABWR SYSTEMS RATHER THAN BASED ON SSAR/SRP STRUCTURE

  - 7 TASK GROUPS FOR MAJOR DISCIPLINE AREAS
  - SPECIALISTS FOR PRA, SEVERE ACCIDENTS, MOVs, ETC.
  - USE OF REVIEW GUIDANCE AND STANDARD ITAAC ENTRIES FOR CONSISTENCY

- KEY ISSUES FOR EACH OF SEVEN TASK GROUPS DISCUSSED

- EMPHASIS IN FSER ON GRADED APPROACH BASED ON SAFETY SIGNIFICANCE OF SSCs

APPROVAL OF CDM/ITAAC

- OVERALL APPROVAL FOR CDM IN FSER SECTION 14.3.6

  The staff concludes that the CDM is necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed, and the acceptance criteria met, a facility referencing the certified design will be constructed and will operate in conformity with the design certification, the provisions of the Atomic Energy Act, and the Commission's rules and regulations.

OPEN/CONFIRMATORY ISSUES

- 1 OPEN ISSUE
  - ACRS COMMENTS ON BUILDING FIRE AND FLOODING DESIGN

- 1 CONFIRMATORY ISSUE
  - ACRS COMMENTS ON PIPING DAC

NRR STAFF PRESENTATION TO THE ACRS

SUBJECT: SAFEGUARDS REVIEW OF ADVANCED BOILING WATER REACTOR DESIGN

DATE: JANUARY 25, 1994

PRESENTER: ROBERT DUBE, SECTION CHIEF
SAFEGUARDS BRANCH, DRSS

PRESENTER'S
PHONE NUMBER: 504-2933

ABWR SUBCOMMITTEE

Scope of Safeguards Review

- Historically, LWR licensing reviews conducted during OL phase

- Focus of this review
  - Identify vital equipment
  - Analyze sabotage vulnerability of safety design
  - Assure safeguards commitments would not inhibit safe plant operations

Staff's Position On Vendor Submittal

- Seismic Class I Safety Related Equipment was identified as vital equipment (Review Guideline 17)

- GE's sabotage vulnerability analysis (per GSI-A29 & EPRI's ALWR Utility Requirements Document Vol III, Chapter 9, Section 5.2.2.1) acceptable

- ABWR Standard Safety Analysis Report found consistent with the requirement that the access authorization system accommodate the potential need for rapid ingress or egress during emergency conditions (10 CFR 73.55(d)(7) (D)(ii))

Major Review Elements Deferred To COL

- Physical Security Plan
- Security Training Plan
- Contingency Plan

Previous ACRS Questions

- Review of current GE drawings did not change staff's findings

- Sabotage Vulnerability Analysis performed by GE to meet EPRI URD Requirement and GSI-A29 and the Commission's Severe Accident Policy Statement and ACRS letter dated 9/2/1983 that the issue of both insider and outside threat be carefully examined, and to the extent feasible, be taken into account in the design of new plants

Previous ACRS Questions (Cont)

- No security based ITACC's or interface requirements were identified
  - Additional requirements for the COL were identified as COL items
  - COL item requires confirmation at least 60 days before loading fuel, that the security systems and programs have achieved operational status and are available for NRC inspection

ABWR SSAR CHAPTER 9.4
HVAC SYSTEMS

SRP SECTION	SSAR SECTION	SSAR TITLE
9.4.1	9.4.1.1	CONTROL ROOM HABITABILITY AREA HVAC SYSTEM
9.4.1	9.4.1.2	CONTROL BUILDING SAFETY-RELATED EQUIPMENT AREA HVAC SYSTEMS
9.4.5	9.4.2	SPENT FUEL POOL VENTILATION SYSTEM
9.4.5	9.4.3	AUXILIARY AREA VENTILATION SYSTEM
9.4.4	9.4.4	TURBINE ISLAND HVAC SYSTEM
9.4.5	9.4.5	REACTOR BUILDING VENTILATION SYSTEM
9.4.3	9.4.6	RADWASTE BUILDING HVAC SYSTEM
9.4.5	9.4.7	DIESEL GENERATOR AREA VENTILATION SYSTEM
9.4.3	9.4.8	SERVICE BUILDING VENTILATION SYSTEM
9.4.5	9.4.9	DRYWELL COOLING SYSTEM

CONTROL BUILDING HVAC SYSTEMS

SERVED BY	SAFETY-RELATED	INSIDE ATMOSPHERE	EXHAUST
Control Room Habitability Area HVACS	YES	Pos. Pressure	• Normal and "Outside Smoke" Removal Mode exhaust to atmosphere. • Exfiltration only during Emergency Recirculation Mode. • Internal recirculation only during site specific Toxic Mode.
CB S-R Equipment Area HVACS	YES	Pos. Pressure	• To Atmosphere.

TURBINE BUILDING HVAC SYSTEMS

SERVED BY	SAFETY-RELATED	INSIDE ATMOSPHERE	EXHAUST
TB HVACS	NO	ATMOSPHERIC CONDITIONS	• TO MONITORED PLANT VENT.
ELECTRICAL BLDG HVACS	NO	ATMOSPHERIC CONDITIONS	• TO ATMOSPHERE.

REACTOR BUILDING HVAC SYSTEMS

SERVED BY	SAFETY-RELATED	INSIDE ATMOSPHERE	EXHAUST
SGTS	YES	NEG. PRESSURE	• TO MONITORED PLANT VENT.
RB SECONDARY CONTAINMENT HVACS	NO	NEG. PRESSURE	• TO MONITORED PLANT VENT.
RB S-R EQUIPMENT HVAC SYSTEM	YES	N/A	• INTERNAL RECIRCULATION ONLY.
RB N-S-R EQUIPMENT HVACS, MST HVACS, & RIP ASD HVACS	NO	N/A	• INTERNAL RECIRCULATION ONLY.
RB S-R ELECTRICAL EQUIPMENT HVACS	YES	POS. PRESSURE	• TO ATMOSPHERE.
RB S-R DG HVACS	Yes ~~NO~~	POS. PRESSURE	• TO ATMOSPHERE.
RB PRIMARY CONTAINMENT SUPPLY/ EXHAUST SYS	NO	N/A	• TO MONITORED PLANT VENT.

SERVICE BUILDING HVAC SYSTEMS

SERVED BY	SAFETY-RELATED	INSIDE ATMOSPHERE	EXHAUST
TSC and Other Cleaned Areas: - TSC HVAC System	NO	Pos. Pressure	• Normal mode of operation, to atmosphere. • Exfiltration only during High Radiation Mode.
Balance of SB Areas: - SB Control Area HVAC	NO	Neg. Pressure	• Site specific Toxic Mode. • To monitored plant vent.

RADWASTE BUILDING HVAC SYSTEMS

SERVED BY	SAFETY-RELATED	INSIDE ATMOSPHERE	EXHAUST
RADWASTE BLDG CONTROL ROOM ZONE - RADWASTE BLDG HVACS	NO	POS. PRESSURE	• EXFILTRATION ONLY.
RADWASTE BLDG PROCESS ZONE - RWB HVACS	NO	NEG. PRESSURE	• TO MONITOR PLANT VENT.

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PRIMARY CONTAINMENT HVAC SYSTEM

SERVED BY	SAFETY-RELATED	INSIDE ATMOSPHERE	EXHAUST
DRYWELL COOLING SYSTEM	NO	N/A	• INTERNAL RECIRCULATION ONLY.

CHAPTER 9 - AUXILIARY SYSTEMS

SECTION	SSAR TITLE
9.1	FUEL STORAGE AND HANDLING
9.2	WATER SYSTEMS
9.3	PROCESS AUXILIARIES
9.4	AIR CONDITIONING, HEATING, COOLING, AND VENTILATION SYSTEMS
9.5	OTHER AUXILIARY SYSTEMS

SECTION 9.1 - FUEL STORAGE AND HANDLING

SUBSECTION	SRP SECTION	SSAR TITLE
9.1.1	9.1.1	NEW FUEL STORAGE
9.1.2	9.1.2	SPENT FUEL STORAGE
9.1.3	9.1.3	FUEL POOL COOLING AND CLEANUP
9.1.4	9.1.4	LIGHT LOAD HANDLING SYSTEM
9.1.5	9.1.5	OVERHEAD HEAVY LOAD HANDLING SYSTEMS

SUBSECTION 9.1.3 - FUEL POOL COOLING AND CLEANUP

SYSTEM DESCRIPTION

NON-SAFETY-RELATED

SEISMIC CATEGORY I, QUALITY GROUP C (EXCEPT FILTER-DEMINERALIZERS)

COOLING CAPACITY:

< 21 DAYS	FPC SUPPLEMENTED BY RHR
> 21 DAYS	FPC
LOSS OF TRAIN	FPC SUPPLEMENTED BY RHR

SUBSECTION 9.1.3 - FUEL POOL COOLING AND CLEANUP

SYSTEM DESCRIPTION (CON'T)

COMMON PIPING:

- DURING NORMAL OPERATION, 1 PATH TO SPENT FUEL POOL (VIA POOL)
- DURING REFUELING, 2 PATHS TO SPENT FUEL POOL (VIA POOL AND REACTOR CAVITY)
- COL APPLICANT TO PROVIDE ADDITIONAL FEATURES TO PROTECT COMMON PIPING

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SUBSECTION 9.1.3 - FUEL POOL COOLING AND CLEANUP

SYSTEM DESCRIPTION (CON'T)

MAKEUP WATER SOURCES:

1. SPCU (VIA DRYER SEPARATOR STORAGE POOL AND VIA FPC PIPING)
2. MUWC (VIA SKIMMER)
3. RHR (SAFETY-RELATED MAKEUP SOURCE)
4. FIRE WATER (HOSE HOOKUP WITH SPOOL PIECE)

VENTILATION:

1. SECONDARY CONTAINMENT HVAC (NORMAL)
2. STANDBY GAS TREATMENT SYSTEM (SAFETY-RELATED BACKUP)

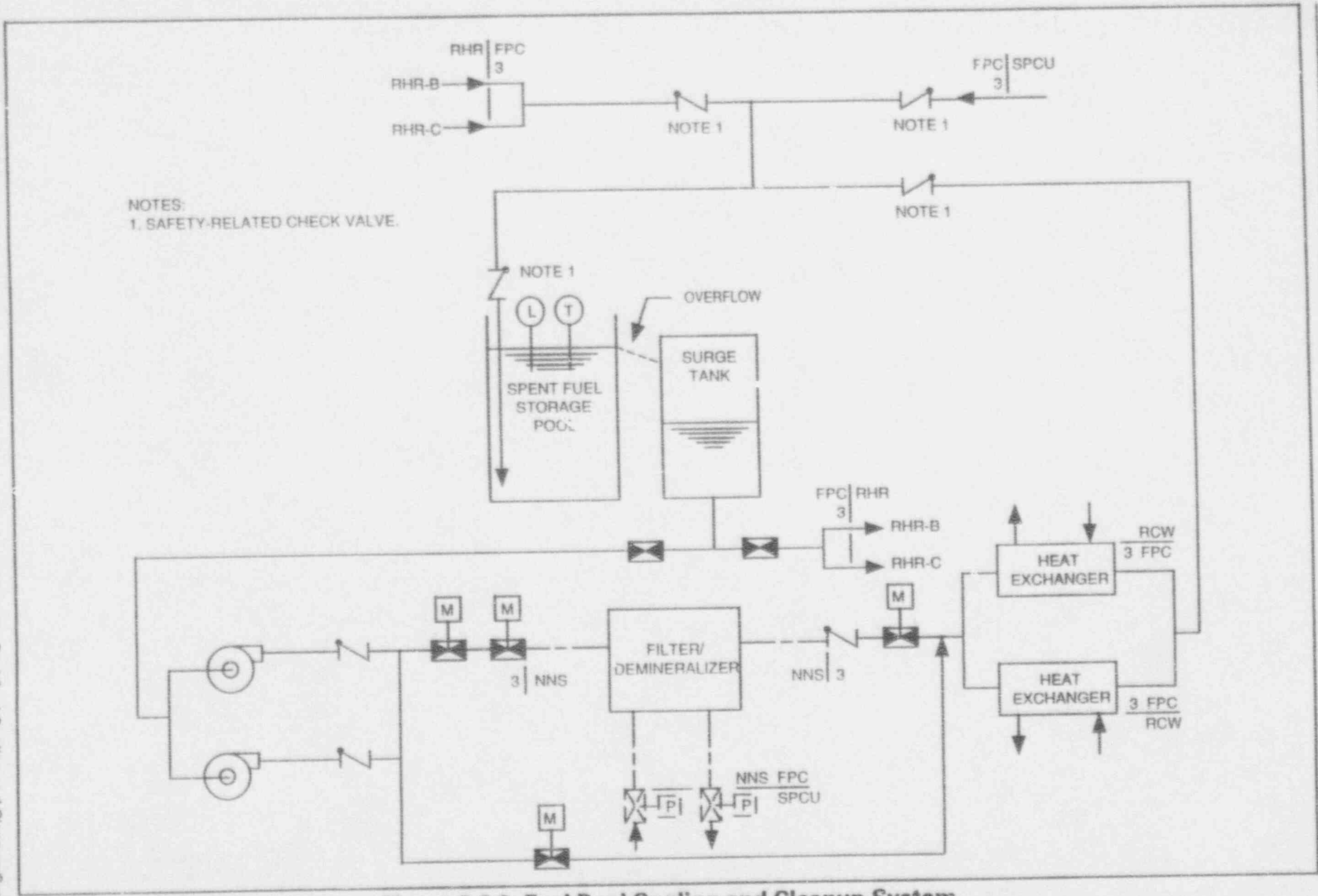


Figure 2.6.2 Fuel Pool Cooling and Cleanup System

9.1.5 - OVERHEAD HEAVY LOAD HANDLING SYSTEMS (OHLHS)

LOAD HANDLING EQUIPMENT IS PURCHASED EQUIPMENT

SSAR PROVIDES DESIGN COMMITMENTS

ALL OHLHS WILL MEET NUREG-0612 GUIDELINES:

1. SAFE LOAD PATHS (COL APPLICANT)
2. PROTECTIVE STRUCTURES (COL APPLICANT)
3. CONSERVATIVE CRANE DESIGN AND FABRICATION (COL APPLICANT)
4. CONSERVATIVE CRANE OPERATION (COL APPLICANT)
5. CONSERVATIVE CRANE MAINTENANCE (COL APPLICANT)
6. SINGLE-FAILURE-PROOF (TYPE I) CRANE (GE)

   REACTOR BUILDING CRANE
   REFUELING MACHINE

9.1.5 - OVERHEAD HEAVY LOAD HANDLING SYSTEMS (OHLHS) (CON'T)

SINGLE-FAILURE-PROOF CRANES (TYPE I) MEET NUREG-0554 GUIDELINES:

1. LOAD RETENTION IN SAFE POSITION ON SUBSYSTEM OR COMPONENT FAILURE
2. DUAL ROPE REEVING SYSTEM
3. CRANE CAN HOLD OR SET DOWN THE LOAD WHILE REPAIRS OR ADJUSTMENTS ARE MADE
4. REEVING DESIGN PREVENTS CUTTING OR CRUSHING OR WIRE ROPE
5. HOIST SYSTEMS PREVENT OVERSTRESSING OF ROPE AND CRANE STRUCTURES
6. FAILURE OF AUTOMATIC CONTROLS AND LIMITING DEVICES SHOULD NOT PREVENT STOPPING AND HOLDING OF LOAD

SECTION 9.2 - WATER SYSTEMS

SUBSECTION	SRP SECTION	SSAR TITLE
9.2.1	9.2.2	STATION SERVICE WATER SYSTEM (DISCUSSED IN SSAR SECTIONS 9.2.15 AND 9.2.16)
9.2.2	9.2.2	CLOSED COOLING WATER DISCUSSED IN SSAR SECTION 9.2.11)
9.2.3	9.2.3/6	DEMINERALIZED WATER MAKEUP SYSTEM (DISCUSSED IN SSAR SECTIONS 9.2.8, 9.2.9, AND 9.2.10)
9.2.4	9.2.4	POTABLE AND SANITARY WATER
9.2.5	NIS	ULTIMATE HEAT SINK NIS - NOT IN SCOPE
9.2.6	9.2.6	CONDENSATE STORAGE FACILITIES (DISCUSSED IN SSAR SECTION 9.2.9)
9.2.7	9.2.2	PLANT CHILLED WATER SYSTEM (DISCUSSED IN SSAR SECTIONS 9.2.12 AND 9.2.13)

SECTION 9.2 - WATER SYSTEMS

SUBSECTION	SRP SECTION	SSAR TITLE
9.2.8	NIS	MAKEUP WATER (PREPARATION)
9.2.9	9.2.6	MAKEUP WATER (CONDENSATE)
9.2.10	9.2.3	MAKEUP WATER (PURIFIED)
9.2.11	9.2.2	REACTOR BUILDING COOLING WATER
9.2.12	9.2.2	HVAC NORMAL COOLING WATER
9.2.13	9.2.2	HVAC EMERGENCY COOLING WATER
9.2.14	9.2.2	TURBINE BUILDING COOLING WATER
9.2.15	9.2.1	REACTOR SERVICE WATER
9.2.16	9.2.1	TURBINE SERVICE WATER

INTERFACING SYSTEMS

INTERFACING SYSTEMS DEFINED IN 10 CFR PART 52

- DESIGN OF SYSTEMS (OR PORTIONS OF SYSTEMS) ARE SITE-DEPENDENT (OUT OF ABWR DESIGN SCOPE)
- CONCEPTUAL DESIGN AND INTERFACE REQUIREMENTS ARE PROVIDED FOR OUT-OF-SCOPE PORTIONS
- COL APPLICANT WILL PROVIDE DESIGN DETAILS AND DEVELOP ITAAC FOR OUT-OF-SCOPE PORTION OF SYSTEMS AT COL STAGE
- STAFF WILL REVIEW THIS INFORMATION AT COL STAGE

INTERFACING SYSTEMS (CON'T)

SEVERAL REACTOR AUXILIARY WATER SYSTEMS ARE FULLY- OR PARTIALLY-INTERFACING SYSTEMS:

- POTABLE AND SANITARY WATER (PARTIALLY)
- ULTIMATE HEAT SINK (FULLY)
- MAKEUP WATER (PREPARATION) (FULLY)
- REACTOR SERVICE WATER (PARTIALLY)
- TURBINE SERVICE WATER (PARTIALLY)

KEY IN-SCOPE PORTIONS ARE VERIFIED BY ITAAC. KEY INTERFACE REQUIREMENTS ARE INCLUDED IN TIER I

4.1 Ultimate Heat Sink

Interface Requirements

The Ultimate Heat Sink (UHS) removes the heat load of the Reactor Service Water (RSW) System during of plant operation. The UHS is not within the Certified Design. The UHS will meet the following requirements:

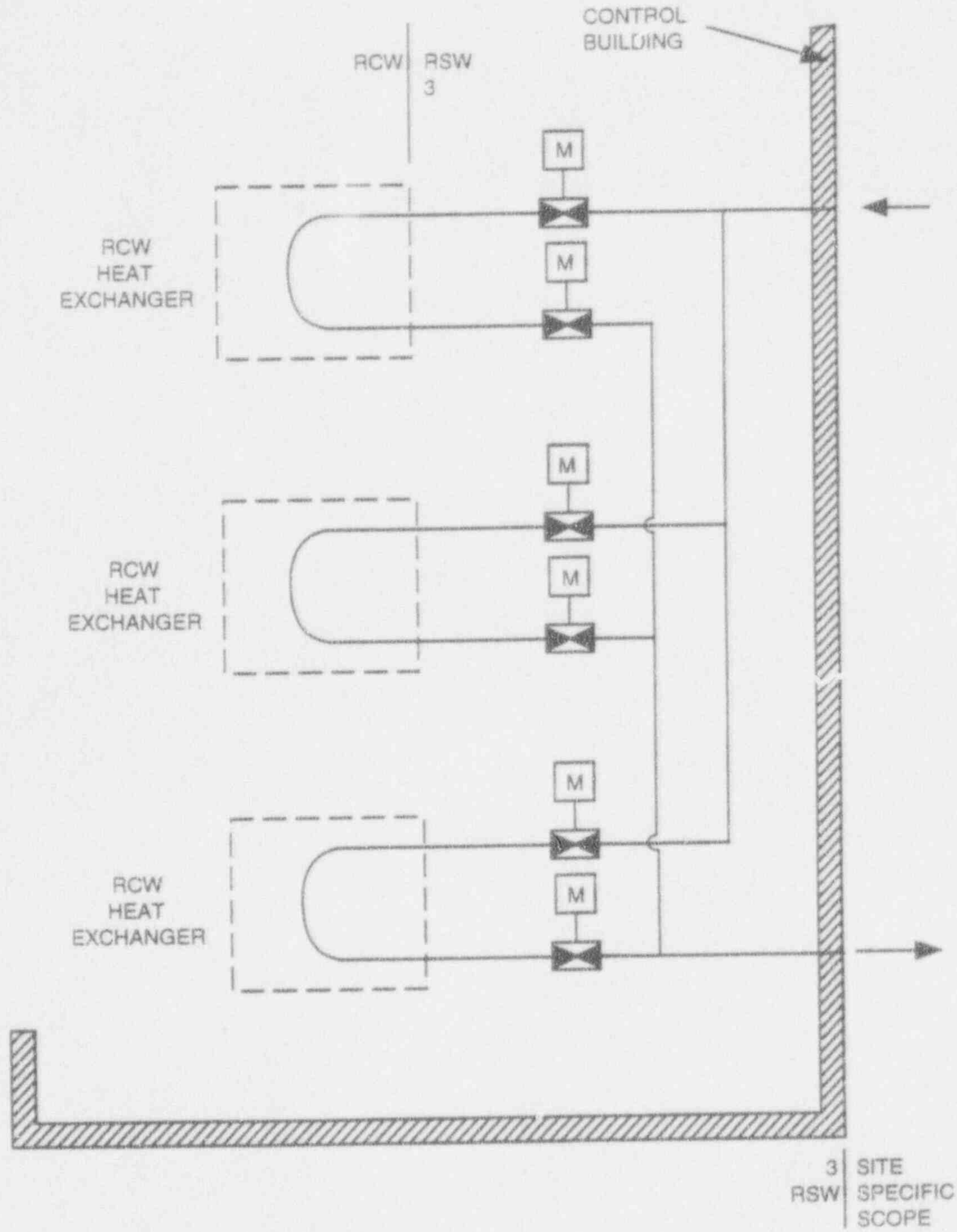
(1) Provide cooling water to the RSW System for normal plant operation and to permit safe shutdown and cooldown of the plant and maintain the plant in a safe shutdown condition for design basis events.

(2) Makeup water for the UHS shall not be required for at least 30 days following a design basis accident.

(3) Any active safety-related system, structure, or components within the UHS shall have three divisions powered by their respective Class 1E divisions. Each division shall be physically separated and electrically independent of the other divisions.

(4) UHS System Divisions A and B components shall have control interfaces with the Remote Shutdown System (RSS) as required to support UHS operation during RSS design basis conditions.

(5) Be classified as Seismic Category I.



NOTES:

1. THIS FIGURE SHOWS ONE OF THREE SIMILAR DIVISIONS. ALL ELECTRICAL POWER LOADS FOR THE COMPONENT IN DIVISIONS A, B, AND C ARE POWERED FROM DIVISIONS I, II, AND III, RESPECTIVELY.

2. VALVES SHOWN ABOVE IN DIVISIONS A AND B HAVE CONTROLS AND OPEN/CLOSE STATUS DISPLAY ON THE REMOTE SHUTDOWN PANEL.

Figure 2.11.9a Reactor Service Water System

9.2.4 - POTABLE AND SANITARY WATER

SYSTEM SCOPE: PORTION WITHIN IN-SCOPE BUILDINGS IS IN-SCOPE
PORTION OUTSIDE IN-SCOPE BUILDINGS OUT-OF-SCOPE

SYSTEM DESCRIPTION

3 SUBSYSTEMS:

1. POTABLE WATER SUBSYSTEM

   SUPPLIES TREATED POTABLE WATER TO BUILDINGS (WATER SUPPLIED FROM MWP)

2. SANITARY DRAINAGE SUBSYSTEM

   COLLECTS AND TRANSFERS WASTES TO SEWAGE TREATMENT
   NONRADIOACTIVE DRAIN SYSTEM (EVALUATED IAW SRP 9.3.3)

3. SEWAGE TREATMENT SUBSYSTEM

   CHEMICALLY TREATS SLUDGE BEFORE DISCHARGE

9.2.4 - POTABLE AND SANITARY WATER

SYSTEM S.OPE: PORTION WITHIN IN-SCOPE BUILDINGS IS IN-SCOPE
PORTION OUTSIDE IN-SCOPE BUILDINGS OUT-OF-SCOPE

SYSTEM DESCRIPTION

3 SUBSYSTEMS:

1. POTABLE WATER SUBSYSTEM

   SUPPLIES TREATED POTABLE WATER TO BUILDINGS (WATER SUPPLIED FROM MWP)

2. SANITARY DRAINAGE SUBSYSTEM

   COLLECTS AND TRANSFERS WASTES TO SEWAGE TREATMENT
   NONRADIOACTIVE DRAIN SYSTEM (EVALUATED IAW SRP 9.3.3)

3. SEWAGE TREATMENT SUBSYSTEM

   CHEMICALLY TREATS SLUDGE BEFORE DISCHARGE

9.2.13 - HVAC EMERGENCY COOLING WATER

SYSTEM DESCRIPTION

SAFETY-RELATED

PROVIDES CHILLED WATER TO:

1. REACTOR BUILDING SAFETY-RELATED ELECTRICAL EQUIPMENT HVAC SYSTEM
2. CONTROL ROOM HABITABILITY AREA HVAC SYSTEM
3. CONTROL BUILDING SAFETY-RELATED EQUIPMENT AREA HVAC SYSTEM

9.2.13 - HVAC EMERGENCY COOLING WATER

SYSTEM DESCRIPTION (CON'T)

EFFECT OF SBO ON HECW:

- ON SBO, HECW LOST UNTIL AAC (CTG) AVAILABLE (10 MINUTES)
- CHILLER NOT AVAILABLE IMMEDIATELY FOLLOWING RESTORATION OF ELECTRICAL POWER
  - EXPERIENCE SHOWS CHILLERS TAKE ~15 MINUTES TO BE FULLY FUNCTIONAL FOLLOWING UNIT SHUTDOWN
- HVAC AVAILABLE AFTER 10 MINUTES
- TEMPERATURE INCREASE IN AFFECTED AREAS OVER THE 10 MINUTE PERIOD BOUNDED BY EQUIPMENT QUALIFICATION CONDITIONS
- COL ACTION ITEM TO RECOVER CHILLERS FOLLOWING LOSS OF POWER (INCLUDING SBO)

SECTION 9.3 - PROCESS AUXILIARIES

SUBSECTION	SRP SECTION	SSAR TITLE
9.3.1	NA	COMPRESSED AIR (DISCUSSED IN SSAR SECTIONS 6.7, 9.3.6, AND 9.3.7)
6.7	9.3.1	HIGH PRESSURE NITROGEN GAS SUPPLY SYSTEM
9.3.6	9.3.1	INSTRUMENT AIR (EVALUATED IN FSER SECTION 9.3.1)
9.3.7	9.3.1	SERVICE AIR (EVALUATED IN FSER SECTION 9.3.1)
9.3.3	9.3.3	NONRADIOACTIVE DRAINS
9.3.8	9.3.3	RADIOACTIVE DRAIN TRANSFER SYSTEM

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6.7 - HIGH PRESSURE NITROGEN GAS SUPPLY

EVALUATED IN FSER SECTION 9.3.1 (COMPRESSED GAS SYSTEMS)

SYSTEM DESCRIPTION

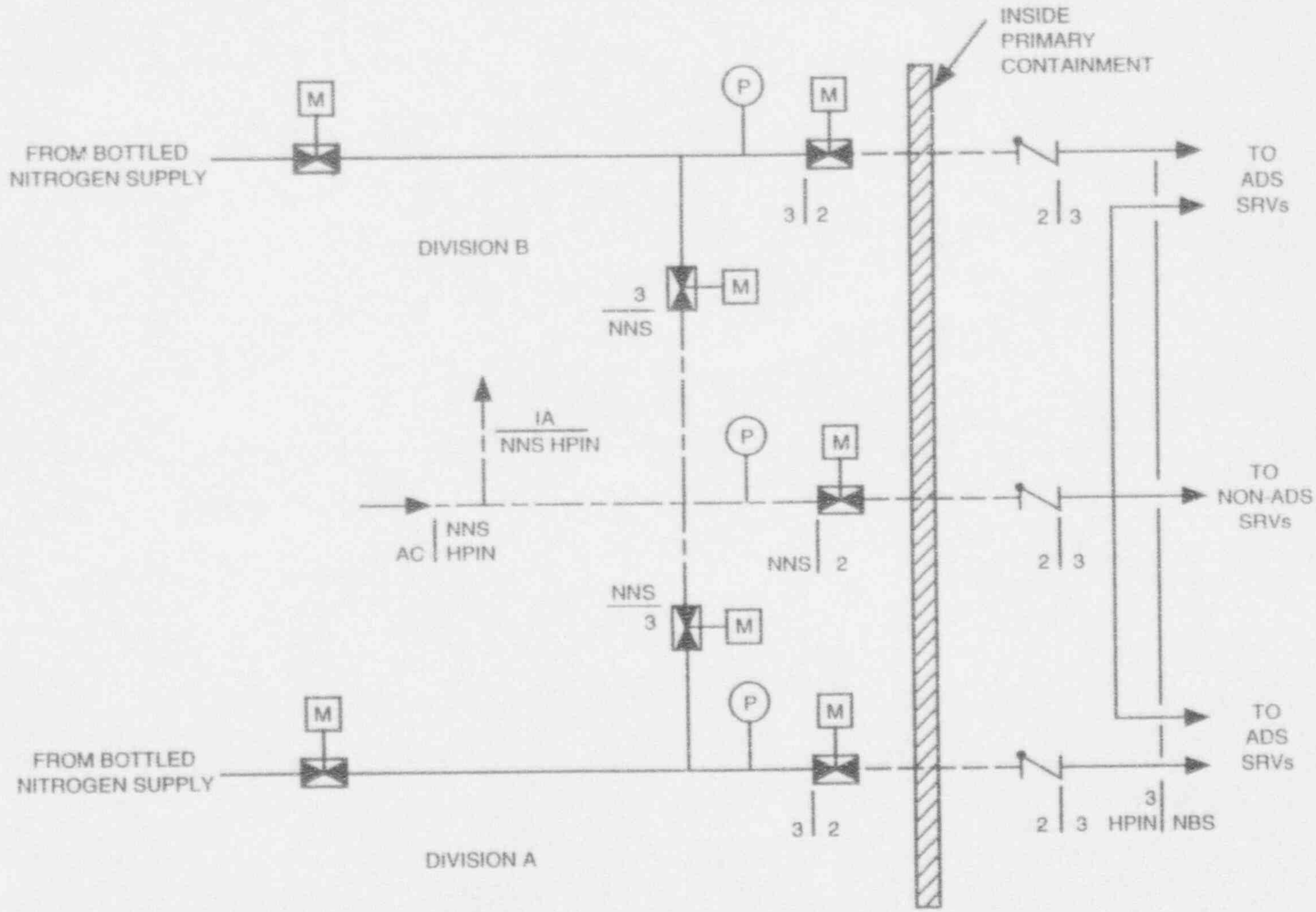
PROVIDES OPERATING FLUID FOR SRVs (INCLUDING ADS VALVES)

SERVES NONSAFETY USERS IN CONTAINMENT

TWO SAFETY-RELATED DIVISIONS, ONE NONSAFETY DIVISION

COMPLIES WITH ANSI MC 11.1 WITH EXCEPTION OF PARTICULATE GUIDELINE (3 MICRON MAX)

- ABWR COMMITS TO 5 MICRON PARTICULATE WITH CONDITION THAT EQUIPMENT SERVED BY SYSTEM CAN ACCOMMODATE THIS PARTICLE SIZE



NOTES:
1. HPIN SYSTEM DIVISION-A IS POWERED FROM CLASS 1E DIVISION I, AND HPIN SYSTEM DIVISION-B IS POWERED FROM CLASS 1E DIVISION II. THE CONTAINMENT ISOLATION VALVE OF NON-DIVISIONAL PORTION OF THE HPIN SYSTEM IS POWERED FROM CLASS 1E DIVISION I.

Figure 2.11.13 High Pressure Nitrogen Gas Supply System

9.3.6/9.3.7 - INSTRUMENT/SERVICE AIR

NONSAFETY SYSTEM

COMPLIES WITH ANSI MC 11.1 WITH EXCEPTION OF PARTICULATE GUIDELINE (3 MICRON MAX)

ABWR COMMITS TO 5 MICRON PARTICULATE WITH CONDITION THAT EQUIPMENT SERVED BY SYSTEM CAN ACCOMMODATE THIS PARTICLE SIZE

9.3.3 - NONRADIOACTIVE DRAINS

PART OF POTABLE AND SANITARY WATER SYSTEM (SANITARY DRAINAGE SUBSYSTEM, SSAR SECTION 9.2.4)

SOME PORTIONS OF SYSTEM OUT-OF-SCOPE

NO INTERCONNECTIONS TO POTENTIALLY CONTAMINATED SYSTEMS

EFFLUENT SAMPLED PRIOR TO DISCHARGE

9.3.8 - RADIOACTIVE DRAIN TRANSFER SYSTEM

NONSAFETY WITH EXCEPTION OF CONTAINMENT ISOLATION VALVES AND BACKFLOW CHECK VALVES

FULLY IN-SCOPE

TRANSFERS POTENTIALLY RADIOACTIVE WASTE (HCW, LCW, SHOWERS) TO LIQUID WASTE MANAGEMENT SYSTEM

SYSTEM SHOWN ON LIQUID WASTE MANAGEMENT SYSTEM P&IDs

DIVISIONALLY SEPARATED UP TO COLLECTION TANKS

BACKFLOW PROTECTION PROVIDED IN DRAIN LINES SERVING ECCS EQUIPMENT ROOMS

SYSTEM ISOLATES ON LOCA SIGNAL

SECTION 9.5 - OTHER AUXILIARY SYSTEMS

SUBSECTION	SRP SECTION	SSAR TITLE
9.5.1	9.5.1	FIRE PROTECTION SYSTEM
9.5.4	9.5.4	DG FUEL OIL STORAGE AND TRANSFER SYSTEM
9.5.5	9.5.5	DG JACKET WATER COOLING SYSTEM
9.5.6	9.5.6	DG STARTING AIR
9.5.7	9.5.7	DG LUBRICATION SYSTEM
9.5.8	9.5.8	DG COMBUSTION AIR INTAKE AND EXHAUST

9.5.4 - DG FUEL OIL STORAGE AND TRANSFER

SSAR WILL CLARIFY THAT NATURE AND DESIGN REQUIREMENTS OF TUNNEL HOUSING FUEL OIL PIPING FROM THE FUEL OIL STORAGE TANKS

SSAR COMMITMENT IS TO PROVIDE 8-HOUR DAY TANK WHILE ITAAC VERIFIES 4-HOUR DAY TANK. 4 HOUR COMMITMENT BASED ON EPRI URD.

CHAPTER ONE

- SIGNIFICANT DEPARTURES:

  1.5 - Summary of Principal Review Matters
  1.8 - Index of Applicable Regulations and Exemptions
  1.9 - Combined License Action Items
  1.11- Index of Unreviewed Safety Questions (Tier 2*)

- OPEN ITEMS:

1.1-1	<u>Resolved</u> EPRI comparison by COMSECY-93-040
F1.1-1	Proprietary justification still <u>open</u>
1.2.2-1&2	Design Control Procedures now <u>confirmatory</u>
1.2.6-1	<u>Resolved</u> scope of certified design - SSAR 1.1.2
F1.9-1	COL Action Items still <u>open</u>

ABWR FSER PROCESS

- Resolve open items and provide page inserts to Advance Copy of SER.
- Resolve confirmatory item F1.1-1 with verification of SSAR, TS, CDM:

  Reviewers verify Amend #33, TS, and CDM against Advance Copy of SER.
  Independent Review Group verifies CDM against TS, SSAR, and SER.
  TS Audit team verifies TS against Standard TS, SSAR, and SER.
- Provide verification comments to GE Nuclear Energy.
- Incorporate comments from the Technical Editors in SER.
- Incorporate comments from the Office of the General Counsel in SER.
- Address ACRS letter in SER.
- Decide on timing of DCD review.
- Verify SER against SSAR Amendment #34.
- Issue Final SER as a NUREG report.
- Prepare Final Design Approval (Conditional or Certification).