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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

AP1000 SUBCOMMITTEE

V.C. SUMMER UNITS 2 AND 3

COMBINED LICENSE APPLICATION

+ + + + +

OPEN

+ + + + +

MONDAY

JANUARY 10, 2011

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ROCKVILLE, MARYLAND

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

SUBCOMMITTEE MEMBERS:

HAROLD B. RAY, Chairman
J. SAM ARMIJO, Member
SANJOY BANERJEE, Member
DENNIS C. BLEY, Member
CHARLES H. BROWN, Member
JOY REMPE, Member
MICHAEL T. RYAN, Member

CONSULTANT:

WILLIAM HINZE

DESIGNATED FEDERAL OFFICIAL:

WEIDONG WANG

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

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

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

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

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

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

8:31 a.m.

CHAIRMAN RAY: The meeting will now come to order.

This is a meeting of the AP1000 Reactor Subcommittee, a standing subcommittee of the Advisory Committee on Reactor Safeguards. I'm Harold Ray, Chairman of the Subcommittee.

ACRS Members in attendance are Sam Armijo, Dennis Bley, Mike Ryan, and Joy Rempe. We anticipate there will be one or two other Members joining us shortly.

ACRS Consultant Dr. Bill Hinze is present. Weidong Wang is the Designated Federal Official for this meeting.

In this meeting, the Subcommittee will review Virgil C. Summer's subsequent COL application. The NRO staff and applicant presented the Summer FSAR Chapter 2, except Section 2.4, evaluation in July 2010 at the AP1000 Subcommittee meeting. The staff and applicant will present the rest of the application in this January 2011 meeting. We will hear presentations from the NRC staff and the representatives from the Summer SCOL applicant, South Carolina Electric and Gas.

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

And I also want to say that the full Committee will review a recommended letter on Vogtle, the reference COL, later this week. Because we had a Subcommittee meeting on Vogtle in late December, the middle of December, I will ask Members if they have any items that they would like to direct to those representing Vogtle who are here, such that they might be addressed tomorrow, when we will expect we will have a very short day, if we don't finish today.

This is a two-day meeting in order to ensure that we cover all of the information required, but that can include items related to Vogtle specifically or to the reference COL. So, like I say, I would alert the Members that I will today ask them to identify anything that they would like to have addressed by Vogtle, either the staff or the applicant, tomorrow, in order to give them time to prepare.

Returning to Summer, for the agenda item on loss of a large area due to fire exposure, the presentation will be closed in order to discuss information that is proprietary to the applicant and its contractors or that is security-related information. This will be pursuant to 5 USC 552 (b)(c) (3) and (4).

Attendance at this portion of the meeting dealing with such information will be limited to NRC staff and its consultants, South Carolina Electric and Gas, and those individuals and organizations that have entered into an appropriate confidentiality agreement with them and who are cleared for the security aspects of the discussion. Consequently, we will need to confirm that we have only eligible observers and participants in the room for the closed portion.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation. Rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in The Federal Register.

A transcript of the meeting is being kept and will be made available as stated in The Federal Register notice. It will sound better than I do now. Therefore, we request that the participants in this meeting use the microphones locate throughout the meeting room. When addressing the Subcommittee, the participants should first identify themselves and speak with sufficient clarity and volume so that they may be readily heard.

We will now proceed with the meeting, and I will ask, first, if the staff has anything they would like to say.

MR. AKSTULEWICZ: Good morning, Mr. Chairman and Subcommittee Members. I'm Frank Akstulewicz. I'm the Deputy Director for Licensing Operations in the Division of New Reactor Licensing. I only have a few comments to make. Joe Sebrosky will make some introductory remarks when he gets into his presentation.

But I welcome this opportunity on the part of the staff to present our evaluation of the Virgil Summer combined license application. I think we will begin to see the benefits of standardization as we move through this application review in a way that we would hope to reduce the demands for time on the part of the Committee Members as well as the staff.

But I, again, look forward this opportunity and hope you find these presentations informative, and we're prepared to answer any questions you have.

CHAIRMAN RAY: Thank you.

With that, we turn to the applicant.

MR. BYRNE: Thank you.

My name is Steve Byrne, and I am the Executive Vice President for Generation for South Carolina Electric and Gas, and I was the company's chief nuclear officer in 2005 when we embarked on this new nuclear build path. So, I am pleased to be here.

I want to say at the outset that we appreciate the significant effort that has gone into this process by both the NRC staff and the ACRS on the AP1000 DCDs and these first couple of COL applications, and we are pleased to be one of those first few COL applications.

Our staff is ready to present the final site-specific aspects of the license application, and I hope you will be pleased with what you see here today and the answers to your questions.

As you're going to see in a few minutes in some slides, we have made excellent progress at the site in preparing for the onset of nuclear safety-related construction activities. We look forward to the successful completion of this licensing process and the start of said nuclear safety-related construction activities.

We have been on this path now for almost six years. So, we're pleased to be at what I consider a milestone Subcommittee meeting. On behalf of our partners, the State utility, Santee Cooper, and South Carolina Electric and Gas, we appreciate this opportunity, and I just want to say thank you.

I will turn it now over to our Licensing Manager for New Nuclear, Al Paglia.

MR. PAGLIA: Well, good morning. I'm Al Paglia, Manager of Licensing for New Nuclear.

And as Steve indicated, we have made significant progress in preparing this site for post-COL construction. This is an overhead shot, essentially, of the entire station, and you can see clearly Unit 1 up here. Of course, Lake Monticello is to the north, and this is the Parr Reservoir over here to the left.

This is what we call the table top area. It's where the two new units will be located. This is the excavation for Unit 2, and I will show a little bit more detail in a second.

This is the switchyard for Unit 1. This is the switchyard for Units 2 and 3. We will be talking about the interconnect and the transmission later on when we discuss Chapter 8.

You can see here also, these are the pads that Chicago Bridge and Iron will be utilizing to fabricate the containment vessel components. Unit 3, of course, will be here, and we are just beginning to drive piles for the retaining wall for the Unit 3 excavation.

This is our module assembly building. I've got a closeup here in a second. Of course, that's where we will be fabricating the modules out of the weather and in a vertical position.

This is our principal building for our project management and technical support staff, and down here is the batch plants.

Now this is a closeup of the table top. Now you can much better see the Unit 2 excavation and the exposed rock, and we'll go further there. A better shot of the CB&A pads. Here we show the MAB, which is essentially completed. And actually, we're occupying this building now for the staff.

Now this shot shows the top of rock, sand rock, as exposed during the Unit 2 excavation last year. This show was taken in August.

The site is set at a grade of 400. This rock is exposed at a 380-foot level. Staff geologists came and inspected this rock and this excavation prior to blasting activities last year to fundamentally determine if there are any capable tectonic faults, and, of course, there are none. And they are going to be providing a full assessment of their visit a little later on in the agenda.

This shot, actually, was taken just last week. And this shows the blasting excavation for Unit 2, and you can see the outline of the nuclear island. This excavation is being taken down to a level of 357 feet, and that's the level at which we will begin to place the fill concrete, once we get the COL.

Now staff geologists and geotechnical folks will come back in the March timeframe, once we finish the blasting and the cleanup activity, to look at the final condition of the excavation and for any effects of the blasting.

So, again, the takeaways are the excavation has gone well. We haven't seen anything that was not expected. And both the condition of the excavation, the overall geology, is consistent with the descriptions and the characterizations that are in the FSAR.

That's all I had to present, Mr. Chairman.

CHAIRMAN RAY: Okay. Bill, do you have any -- no?

DR. HINZE: No, not at this point.

CHAIRMAN RAY: Okay. Thank you.

MR. PAGLIA: All right. With that, then, we will turn it over to Amy and Joe for the presentations.

MS. MONROE: Joe, did you have anything you wanted to say?

MR. SEBROSKY: No, I'll make the introductory comments when we get to the beginning of 2.4.

MS. MONROE: This is Amy Monroe. I'm a Licensing Engineer with SCE&G.

Now we're going to move forward and address our last major site-specific section in Chapter, and it's Section 2.4, which deals with hydrology, both surface and ground hydrology.

We have Mr. Steve Summer and Angelos Findilrokis here to give the presentation.

Steve?

MR. SUMMER: Good morning.

I'm Steve Summer, and I'm a supervisor in SCANA Services.

CHAIRMAN RAY: Any relation?

MR. SUMMER: If it is, it's very distant.

(Laughter.)

The same part of the country.

Next slide, Amy.

What I will be discussing today is FSAR Section 2.4, Hydrologic Engineering. The DCD is incorporated by reference. No extensions are requested, and we had one administrative departure, 2.0-1, which pertains to section numbering to align with Reg Guide 1.206 and to facilitate NRC review.

MEMBER BROWN: Harold, could I ask one general question?

CHAIRMAN RAY: Yes.

MEMBER BROWN: It's a very top-level one that will reference DCD incorporated by reference because it applies across the board.

When I was looking, I noticed there's no discussions relative to Chapter 7 incorporated by reference and a few other things. When I went to say, okay, it's incorporated by reference, looking in Chapter 1, I think, Part 1, whichever part it is, the reference you're all going with is Rev. 17 of the DCD. That's the one that's in the FSAR.

The one where my interest is is Rev. 18, where all the I&C, turbine overspeed information, et cetera, et cetera, is incorporated, either that or I missed it, where Rev. 18 gets brought in as the reference DCD for this COL.

MR. SUMMER: Can you address that, Amy?

MS. MONROE: Yes. We will be making another submittal, revision to our application now that Rev. 18 has gone in. We have to do things sort of in a systematic approach.

First, Vogtle will submit their RCOLA revision that will incorporate Rev. 18 by reference, and, then, we will follow suit and update to incorporating Rev. 18 in our application. So, right now, we're about a month away probably from where we'll be submitting an updated revision to our FSAR that will incorporate Rev. 18.

MEMBER BROWN: Okay.

MS. MONROE: We will ultimately incorporate whatever revision is made into the rule.

MEMBER BROWN: I presume that if you have any departures you will bring those in at the same time, if you had some disagreements, or whatever, with what's in there, similar to the past practice. But you're going to follow Vogtle? You're going to be waiting for Vogtle to do their upgrade up to Rev. 18 first?

MS. MONROE: Right. Correct. The way we work the process is we always let the reference COLA go first because --

MEMBER BROWN: Okay. Well, all right.

MS. MONROE: -- then we want to make sure that we are identically incorporating the reference COLA or else spelling out the fact that we are different. And we do that in the document itself by utilizing left margin annotations.

MEMBER BROWN: Okay.

CHAIRMAN RAY: Well, now that's a good question, Charlie, because it implies something which I don't know, but I mean we always assume to be true, but I don't know that we ever really understood how it worked. Because even 18 isn't the end of the road, of course. So, it's a good question.

Go ahead.

MR. SUMMER: Okay. Go to the next slide.

MEMBER BROWN: One other. I presume we will get to see, isn't that correct, any revision to this relative to how they incorporate? I mean, so we will have an opportunity to make sure that the stuff we were interested in that got incorporated in Rev. 18 actually is fully incorporated and not departed from? That's an assumption, but maybe that's a bad assumption?

CHAIRMAN RAY: That assumption I think we need to talk about --

MEMBER BROWN: Okay.

CHAIRMAN RAY: -- not with the applicant, but perhaps with the staff.

MEMBER BROWN: No, that's fine. I agree.

CHAIRMAN RAY: Because these changes go on forever.

MEMBER BROWN: I got you.

CHAIRMAN RAY: And they're not coming back here after some point in time.

MR. SEBROSKY: Yes, this is Joe Sebrosky. I'm the lead Project Manager for the Safety Review for the NRC.

And you're correct, Mr. Ray, there is no intention to bring Rev. 18 back to the ACRS on the design cert side of the house on Vogtle or on Summer. The thought being that anything that's in DCD Rev. 18 that's of interest was captured as a confirmatory item from DCD Rev. 17.

So, if you look at the Vogtle COL application, when that was provided, it was based on DCD Rev. 17. It had several confirmatory items in it. Those confirmatory items are also carried forward in the Summer application.

So, the hope was that we would get a letter report on Vogtle based on Rev. 17 with confirmatory items.

CHAIRMAN RAY: In other words, how something is implemented by Summer, for example, that's a confirmatory item will not be brought back here and said, "Well, this is how we did it."? It's sufficient, presumably, that the confirmatory item exists.

MEMBER BROWN: I'm interested in that answer because the specifics of the I&C and the turbine overspeed trip design changes are captured without confirmatory items by changes in the DCD, at least -- correct me if I'm wrong -- along the path.

Therefore, I'm interested in knowing, does somebody submit departures or some disagreements along the way. And if there are, then I would like to see them, just personally. We have to get the Committee to agree to that, but I would be interested in seeing what those changes were in those two particular areas before we went forward because that's the way we wrote our letter several weeks ago.

MR. SEBROSKY: I understand.

MR. AKSTULEWICZ: This is Frank Akstulewicz again.

I think the process points that have been raised here are interesting, and I would encourage that discussion at the end of the day. But I think, more to the point, if there are departures that are of significance that we feel the Committee would like to see, we would certainly bring them back before we issued the license.

As far as the incorporation of the Rev. 18 material, those items are being captured as changes to tech specs and such as part of the DCD. So, those modifications would be incorporated by reference, and implementation, then, would be straightforward from the standpoint of them being standard tech specs.

But, rather than get involved in that discussion now, I would encourage us to move through the material and, then, discuss the process points this afternoon.

MEMBER BROWN: Well, that's fine. It's just that the stuff I'm interested in is not really tech-spec-type stuff. It's actually design-basis-type stuff.

MR. AKSTULEWICZ: I understand. That's a good point.

CHAIRMAN RAY: Yes, maybe for that discussion, Frank recommended, and I agree, maybe get something as specific as possible for us to chew on.

MEMBER BROWN: That's why I wanted to bring it up now.

CHAIRMAN RAY: Okay.

MEMBER BROWN: So, thank you.

CHAIRMAN RAY: Proceed.

MR. SUMMER: In hydrologic engineering, we had six COL information items that were addressed: hydrological description, floods, cooling water supply, groundwater, accidental release of liquid effluents into ground and surface water, and flood protection emergency operation procedures.

The first item, hydrological description, describe the major hydrologic features on or in the vicinity of the site.

My slide is not nearly as pretty as the one that was up there earlier.

The site is located about a mile to the south of Monticello Reservoir, the upper pool of the Fairfield storage facility, and it is a source of makeup water for normal operation for Units 2 and 3.

The Broad River and Parr Reservoir, which is a dammed portion of that river, runs generally northwest to southeast. And I've got a note to show where the location of the units are. You may have done that when I wasn't looking.

Monticello Reservoir provides cooling and makeup water for Unit 1 also.

The next slide.

This slide shows the site topography. The Units 2 and 3 site is situated on a ridgetop with a design plant grade elevation of 400 feet NAVD88, which is North American Vertical Datum of 1988. And that's about 150 feet above the Broad River flood plain.

It should be noted that Summer Station's 2 and 3 plant grade elevation of 400 feet is equivalent to the AP1000 DCD design plant grade of 100 feet.

As can be seen from the figure, surface water would drain away from the site, both to the west, to the east, and to the southeast. And eventually, all those flows go to the Broad River.

COL Item 2.4-2, floods. Address the site-specific information on historical flooding and potential flooding factors, including the effects of local intense precipitation.

The conclusion is that there is no risk to safety-related system structures and components from flooding. The probable maximum flood level is more than 100 feet below the site grade, and the site is not susceptible to surges, seiches, or tsunami.

COL Item 2.4-3, cooling water supply. Address the water supply sources to provide makeup water to the service water system cooling tower.

The Broad River and Monticello Reservoir are used as a cooling water makeup source, and all non-safety-related.

Ice effects are highly unlikely.

And the Broad River is adequate for non-safety uses even during low-flow conditions.

COL Item 2.4-4, groundwater. Address site-specific information on groundwater.

There are no plans to use local groundwater for construction or operation of VC Summer Units 2 and 3. Water for construction purposes will be obtained from the Monticello Reservoir and from the Jenkinsville Water District.

MEMBER RYAN: Just for clarification, is there impact or expected impact on the groundwater level, its flow characteristics, and so on, from the construction?

MR. SUMMER: I don't believe so. Angelos, you may address that.

MR. FINDILROKIS: No. The water table may be a little lower than what it is today because of reduced --

MEMBER RYAN: Infiltration?

MR. FINDILROKIS: -- infiltration as the result of the drainage system that will be in place.

But, other than that, no, no other major impact.

MEMBER RYAN: No shifts in direction of flow or anything like that?

MR. FINDILROKIS: No. No. Our projection is that in the future, as it is today, basically, the direction will be sort of similar to the direction. So, basically, we will have all of the groundwater flow will be directed toward the Broad River to the west and part towards the east and the south towards Mayo Creek.

MEMBER RYAN: So, if I'm understanding you right, I think this is consistent with what you said in the past. It's really a groundwater mound you are on in this, kind of flow in almost all direction except maybe directly north.

MR. FINDILROKIS: Exactly. The piezometric surface sort of mimics the topography. So, it is like a subdued expression of the topography.

MEMBER RYAN: Thank you very much.

MR. SUMMER: Thank you.

We'll go to the next slide.

Continuing with 2.4-4, as mentioned previously, Units 2 and 3 are located on the ridgetop. And as Angelos was saying, the piezometric contour maps developed from levels measured for one year, from

June 2006 to June 2007, indicate that groundwater flows in all directions except north from the ridgetop.

DR. HINZE: Excuse me, if I may, Steve.

MR. SUMMER: Yes.

DR. HINZE: The piezometric surface was defined by about 30 wells that were put into the area? Are those subsequent to Unit 1 operating? Are those new wells?

MR. SUMMER: They were new wells.

DR. HINZE: And how were they located? What was the decision factor? What criteria were used to select where to put the holes?

MR. SUMMER: Do you want to address that?

MR. FINDILROKIS: Yes. They were wells in the immediate vicinity of the two units. And, then, by inspection of the topography, during the design of the investigation program, we selected the locations in a way that basically captured, in essence, captured the potential -- as I described before.

Because since the site is located on the ridgetop, we are expecting that it will have flow in all directions. So, we tried to locate wells in all directions in order to actually capture the piezometric surface.

DR. HINZE: Did you have a topographic map of the bedrock surface to assist you in making certain that you had the complete range of topography involved?

MR. FINDILROKIS: At that time, I think there was some preliminary information on the bedrock from some geotechnical bore holes that had been already drilled before the installation of the groundwater was -- but it was in part. But, of course, we didn't have the complete information on the bedrock beyond the immediate vicinity of the units. So, it was sort of by extrapolation. I guess we tried to design the investigation for all the many locations of these wells.

DR. HINZE: And the depth of the wells, did they go to bedrock?

MR. FINDILROKIS: Yes, they did. In fact, we have wells both in the saprolite, in the shallow unit, and in the bedrock, and in some cases we had passive wells located side by side measuring the piezometric levels in both the bedrock and the upper unit.

DR. HINZE: Were there any artesian conditions that you encountered?

MR. FINDILROKIS: No.

DR. HINZE: Thank you.

MR. SUMMER: Thanks.

And as you can see from this slide, we present the piezometric contours, and they indicate that the shell's subsurface groundwater flow is away from the site.

Yes, you can show that, from the higher levels near Units 2 and 3, going east toward Mayo Creek, the drop in levels, also to the southwest and above Unit 2 over to the west.

MR. FINDILROKIS: And, Steve, if I may, we developed corners of the piezometric for both the shallow unit and the bedrock. So, we have two sets, in replication, we have two sets of contours.

DR. HINZE: At the bedrock surface and, then, at the top of the saprolite?

MR. FINDILROKIS: Right. Basically, a set of contours based on the data from the wells that were screened in the saprolite and another set of contours based on the data from the wells that were screened in the bedrock.

DR. HINZE: When you drilled to bedrock, did you find any evidence of hydrothermal alteration within the bedrock itself when you drilled to the bedrock?

MR. FINDILROKIS: No.

DR. HINZE: It was all very competent?

MR. FINDILROKIS: Uh-hum.

DR. HINZE: Thank you.

MEMBER RYAN: The unit that's right here on the bottom, that's the highest point in the whole system? Probably with which unit that is.

MR. FINDILROKIS: Yes, in the center, right.

MR. SUMMER: Right there in the center where Unit 3 would be located.

MEMBER RYAN: Unit 3, okay.

MR. SUMMER: Yes.

MEMBER RYAN: I guess when you get construction on top of that place, the mound will become even more steep? It's fairly steep groundwater gradient.

MR. SUMMER: Which reflects the topography there, which is pretty steep going off that ridge.

MEMBER RYAN: Yes. Does it match pretty much the topography, the falloff? So, you have, I'm going to guess, a relatively constant separation between the surface and the saturated zone as you move down the slope?

MR. SUMMER: Uh-hum.

MEMBER RYAN: Thank you.

MR. SUMMER: Next, continuing with 2.4-4, again, the design plant grade elevation is 400 feet, which is equivalent to 100 feet from the AP1000 DCD. The maximum allowable groundwater level is 398 feet, and the maximum expected groundwater level is 380 feet, well below the design value of 398.

Next slide.

COL Item 2.4-5, accidental release of liquid effluents into ground and surface water. Address the site-specific information on the ability of the ground and surface water to disperse, dilute, or concentrate accidental releases of liquid effluents. Also address the effects of these releases on existing and known future use of surface water resources.

And continuing with that section, evaluation shows that an accidental liquid release of effluents in groundwater would not exceed 10 CFR Part 20 limits, and three conceptual flow transport models, one saprolite and two bedrock, are presented.

The assumed accidental release scenario assumes an instantaneous release from one of the two effluent holdup tanks located in the lowest level of the AP1000 auxiliary building. The next three slides are examples of the conceptual models of the transport pathways for saprolite, shallow bedrock, and deep bedrock to the Broad River to the west, from Mayo Creek to the east, and deep bedrock to a hypothetical well at the nearest point outside the SCE&G property line. This is also to the east.

MEMBER RYAN: You said one to two holdup tanks? Was it one or two?

MR. SUMMER: Well, it was one, assumed at least one. “One of two” is what I meant to say. “One of two.”

MEMBER RYAN: Oh, one of two, okay. I got you.

Those that assume radiological contact in terms of, how do you assume an inventory in the holdup tank?

MR. FINDILROKIS: This was based on what is described in the DCD in a calculation performed by Westinghouse. And we assumed that 80 percent of the contents at the time are released in the groundwater. And I believe that this is per an NRC guidance.

MEMBER RYAN: Thank you.

MR. SUMMER: This first figure represents the saprolite pathway, and this flow transport pathway flows through the saprolite zone and discharges to a stream. We believe that this pathway is the most probable.

The second figure shows a bedrock pathway to the Broad River or stream, Mayo Creek. And in this flow transport pathway, flow is through the bedrock and discharges to a stream.

DR. HINZE: Is there sufficient number of fractures and joints in the bedrock to even consider this model?

MR. SUMMER: We considered this and the other model I think primarily based on NRC staff input.

But go ahead and address that, Angelos.

MR. FINDILROKIS: We think that there is not sufficient connectivity between fractures to provide a continuous pathway all the way to the Broad River. However, to be on the conservative side, in a response to comments by the NRC, we included additional pathways like the one that is shown in this slide and also another one which --

DR. HINZE: The next slide?

MR. FINDILROKIS: -- Steve will show you in the next slide, that takes it even beyond Mayo Creek to a hypothetical well on the property boundary of SCE&G.

MEMBER BANERJEE: How did you estimate the -- I guess it's not porosity, but the network of fractures, or whatever, there? The permeability, how did you get that?

MR. FINDILROKIS: We have data on the hydroconductivity of the rock. And, then, we assumed that the fractures provide a continuous pathway.

MEMBER BANERJEE: Was this data obtained by putting tracers and seeing how it moved?

MR. FINDILROKIS: No. Basically, what we did is that we assumed, again, that as water moves through the bedrock, we can have a continuous pathway from the site all the way to the discharge pond.

MEMBER BANERJEE: But there was no in situ test done --

MR. FINDILROKIS: No.

MEMBER BANERJEE: -- with tracers?

MR. FINDILROKIS: No.

MEMBER BANERJEE: And the saprolite, how did you get the permeability?

MR. FINDILROKIS: For the saprolite, again, the same thing. We had data and we characterized the properties of the saprolite, the hydroconductivity and the porosity. And based on this, we assumed one-dimensional transports directly along the pathway from the tank to the discharge pond.

MEMBER BANERJEE: When you took those samples, didn't you sample the saprolite, take core samples and look at the permeability?

MR. FINDILROKIS: Yes, we did. We did. We did several things. First of all, for the saprolite, primarily, we conducted in situ tests for the hydraulic properties. So, it was a slug test that gave us estimates of the conductivity.

In addition to that, we took samples that we analyzed for the distribution coefficient for the KD, that to characterize the absorption characteristics of the material, which is also, of course, used in the transport analysis.

And, of course, we had data on the hydraulic gradient that we used. We estimated the migration velocity through both the saprolite and the bedrock.

MEMBER BANERJEE: So, you based it, basically, on the hydraulic gradients?

MR. FINDILROKIS: Yes. The analysis that we did was fairly simple. We assumed one-dimensional transport, assuming a uniform velocity between the two points, and this velocity was determined based on the hydraulic gradient and the hydraulic conductivity of the material which was measured, as I mentioned.

MEMBER BANERJEE: I still don't understand how you measured the hydraulic conductivity.

MR. FINDILROKIS: We measured it by conducting a slug test, basically, by injecting a quantity of water in the well and see how the well responds, how the water surface, the water level in the well dropped. And, basically, by analyzing the response, we estimated the hydraulic conductivity of the surrounding material.

MEMBER BANERJEE: Well, did you take credit for ion exchange? You said you had a KD for this?

MR. FINDILROKIS: The KD was separate.

MEMBER BANERJEE: Separate? Yes.

MR. FINDILROKIS: A separate test.

MEMBER BANERJEE: But you did several separate tests?

MR. FINDILROKIS: Yes, this was tests in the laboratory. We sent it to Savannah River.

MEMBER BANERJEE: With the rock samples?

MR. FINDILROKIS: Right. So, we took samples that we sent to the laboratory to measure the --

MEMBER BANERJEE: And what radionuclides and what sort of form were they that you were looking at?

MR. FINDILROKIS: We looked primarily -- you see, we considered the full range of nuclides in the analysis. And of course, for those that are short-lived, there was no need to conduct tests. So, basically, through the initial screening, we identified the nuclides that were the longest-lived. And for each, of course, we knew that they would have some absorption, and these are the ones that we tested for.

MEMBER BANERJEE: And you took credit for this absorption?

MR. FINDILROKIS: Yes. We did the analysis in stages. So, in the first stage, we didn't take any -- we accounted only for decay. And, then, for those nuclides that decay was not enough to eliminate them, we accounted also for absorption. And also, we accounted for dilution. Then, after the stress point, we accounted for dilution in surface water. And this is how we estimated the ultimate concentration of these nuclides.

MEMBER BANERJEE: And how far is that creek from the release location or potential release --

MR. FINDILROKIS: It varies. The distance is, the nearest creek is something of the order, I believe, of 600 to 700 feet. The Broad River is about a mile. Because the pathway, the first pathway, if we go to one slide before, the one which is the most plausible, I think we have it. Yes.

MR. SUMMER: Right.

MR. FINDILROKIS: Now, in this, basically, this shows a pathway from the units to a nearby creek about, I think, 500 to 700 feet from the units. And, then, we assumed water discharging and discharged in this creek, basically, would flow into the Broad River.

MEMBER BANERJEE: Since you didn't take account -- so, this is a 1-D model, right?

MR. FINDILROKIS: This is 1-D.

MEMBER BANERJEE: So, how are you putting in the dilution?

MR. FINDILROKIS: The dilution is in the surface water. So, basically, this water will flow into the Broad River and will be mixed with water in the river.

MEMBER BANERJEE: Okay. So, you take a dispersion model for the river of some sort?

MR. FINDILROKIS: Well, for the river, we assume mixing with the river water.

MEMBER RYAN: Sanjoy, I am guessing there was a fractional contribution from the weep into the stream.

MEMBER BANERJEE: What I'm wondering is, if they did not take account of the ion exchange, which you call absorption, how much of an effect does that have on the critical radionuclides?

MR. FINDILROKIS: For some, it does have. And as I said, we --

MEMBER BANERJEE: The short-lived ones move on, right.

MR. FINDILROKIS: We did account for absorption for those nuclides that we had laboratory data for site-specific samples. So, for these nuclides that we performed laboratory tests we did account for absorption.

MEMBER BANERJEE: Right, but what was the effect? Suppose you had turned it off in your model. How large was the effect? Was it a factor of two, 1.5, in the concentrations?

MR. FINDILROKIS: I can't tell you offhand. I mean I have to go back and look at those numbers.

MEMBER BANERJEE: What I'm seeking is the sensitivity of the result to the assumptions that you've put in. If you're far way from any limits, it doesn't matter, but if you are fairly close -- are you close to anything, any sort of limits?

MR. FINDILROKIS: Again, I need to go back and, obviously, the reason that we accounted for absorption was that, yes, it did matter.

MEMBER BANERJEE: You needed it.

MR. FINDILROKIS: We needed it right. Right. I mean the approach that we followed in general was to, whatever we could use, the most conservative assumptions, like ignore absorption, ignore dilution, we did. But when this was not enough to satisfy the regulatory limits, then we did account for additional processes.

MEMBER BANERJEE: I think that the approach is clear. It's only a question of how the results are affected by, say, uncertainties in KD or velocities or dispersion factors. They may not be very sensitive, but I just don't know.

Let me ask you about question. How much do the absorption factors vary along the paths?

MR. FINDILROKIS: We assumed that it is constant.

MEMBER BANERJEE: Is that a reasonable assumption?

MR. FINDILROKIS: Because we had laboratory data for several samples, and we used the lowest value from all the tests to be on the conservative side. And, then, we assumed this value for KD applies along the entire path, the groundwater path.

MEMBER BANERJEE: What is the critical radionuclide in terms of concentrations? Which one was it?

MR. FINDILROKIS: I have to look at that again. I cannot say --

MEMBER RYAN: Sanjoy, I think it would be helpful to get a list of the radionuclides that contributed significantly to the dose that was calculated and those that did not for the two cases with absorption and without, so that you can kind of get a ranking of how things lay out. Would that be possible?

MR. FINDILROKIS: Right. We have

presented all this in the SAR. If you want, I can look it up during the break and get back to you.

MEMBER BANERJEE: Sure. I mean the SAR is so extensive a document.

MR. FINDILROKIS: Right. Right, but I mean I can quickly find it.

MEMBER BANERJEE: I can't get my mind around it.

MR. FINDILROKIS: I can get back to you after the break.

DR. HINZE: Before we get started again, going back to this bedrock pathway, Al showed us this January photograph of this swimming pool, the nuclear island. What kind of ponding are you seeing in that swimming pool as a result of recent rains?

MR. SUMMER: I haven't been out there to the construction site recently and seen that. I don't think it's a lot of water.

DR. HINZE: Is it ponding? I guess that's a question. Is it ponding or are there sufficient fractures that this is not --

MR. WHORTON: This is Bob Whorton, SCE&G.

The groundwater that we're seeing in the area is substantially lower than the current location of the excavation at elevation 357 by some 20 feet or more.

DR. HINZE: Right.

MR. WHORTON: We've had a lot of rain, and the way we are cleaning the site, we are diverting any rainwater down to that low area. So, it's ponding at the groundwater nominal elevation.

DR. HINZE: But over the weekend, if you get a rainfall, do you go out there and see ponds in the swimming pool?

MR. WHORTON: Well, not at the 357 elevation. The rock falls off fairly dramatically from 357 down to a lower elevation, and any ponding --

DR. HINZE: But the nuclear island is flat with your excavation, right?

MR. WHORTON: At least half of the nuclear island is flat.

DR. HINZE: Okay.

MR. WHORTON: We're excavating into the sound rock. At a midpoint in the nuclear island, the rock actually starts falling off to a lower elevation.

DR. HINZE: Well, within this flatter area, do you see any ponding?

MR. WHORTON: No, we have not seen any.

DR. HINZE: In other words, it infiltrates through the saprolite and, then, into the --

MR. WHORTON: We're actually at that elevation you saw where that trackhoe was located.

DR. HINZE: Right.

MR. WHORTON: It was 357, which is the base that we're excavating into the rock. At that location, we are not seeing any -- if we have rain or snow, or whatever it may be, that water basically flows away from that actual location.

DR. HINZE: So, it's not a matter of infiltrating?

MR. WHORTON: Not at that point.

DR. HINZE: Well, what I'm getting at is the integrity of the bedrock and the applicability of this bedrock pathway.

MR. WHORTON: The rock at that location is very sound. There are minor fracture features, but it's not a feature that would readily allow the water to seep through and out.

DR. HINZE: I'll ask Gary when he get up then. Okay. Thank you. He's probably looked at that piece.

MR. SUMMER: To get back to where we were, talking about the bedrock pathway to the Broad River and Mayo Creek, and in this example we have flow through the bedrock and being discharged to the creek.

Mayo Creek, this bed is cut all the way down to the bedrock. So, it's not like you see a bunch of sediment on the bottom there; you actually see the rock.

The third example, next slide -- yes, there we go -- shows the transport pathway not being intercepted by the stream, and we show this flow through bedrock underneath Mayo Creek and discharging to a hypothetical well located at the property boundary. Again, none of these pathways resulted in values exceeding 10 CFR Part 20 limits.

Next slide.

COL Items 2.4-6, flood protection emergency operation procedures. Address any flood protection emergency procedures required to meet the site parameter for flood level.

Since the safety-related systems, structures, and components at Units 2 and 3 are not subject to flooding, no additional flood protection measures and no emergency procedures are required.

Next slide.

RAIs. We had two questions on flooding, six related to groundwater and 14 related to accidental release of radioactive liquid effluents in ground and surface waters. All the questions have been answered and considered to be resolved.

MEMBER BANERJEE: What were the questions on flooding?

MR. FINDILROKIS: Yes, the two questions on flooding were, basically, both questions were related to the analysis for the probable maximum precipitation at the site, at the site itself.

And one question was the NRC asked us to provide some of the specific details of the analysis that we did to estimate the maximum water levels, like the cross-sections that we used, because we analyzed the flow of precipitation from different parts of the site towards the drainage, towards the exist points. So, they asked us to provide the cross-sections that we used, so they can basically duplicate the analysis.

MEMBER BANERJEE: Cross-sections of what?

MR. FINDILROKIS: Cross-sections because we used a flow model to estimate the flow as it drains, as the water drains through different parts of the site. Basically, we use like a model that models channel flow. So, in order to simulate the channel flow, we use cross-sections.

MEMBER BANERJEE: Oh, I see. So, you have sort of --

MR. FINDILROKIS: Basically, the details of the geometry --

MEMBER BANERJEE: Yes.

MR. FINDILROKIS: -- and this way that we used to do the analysis.

MEMBER BANERJEE: So, you have sort of drains going away from the site, right, somewhere? Is that the cross-section you're talking about?

MR. FINDILROKIS: Right. The cross-section, basically, if you can think of the site, for example, of the ground sloping in different directions. So, you have drains from one area and then from another area. So, as these two surfaces converge, this was modeled as a channel. It was a three-angular channel.

MEMBER BANERJEE: I see.

MR. FINDILROKIS: So, basically, we're talking about the geometry of a cross-section of this channel.

MEMBER BANERJEE: Do you get very heavy rains there?

(Laughter.)

MR. FINDILROKIS: But, of course, the analysis was for the probable maximum precipitation.

MEMBER BANERJEE: So, historical records?

MR. FINDILROKIS: Not only on historical, but -- historical, yes, and projections, basically, yes.

MEMBER BANERJEE: Projections.

MEMBER RYAN: I am guessing the rain event is a hurricane.

MR. SUMMER: We have thunderstorms, and I can check on it, but my guess would be that's our hurricane-related --

MEMBER RYAN: I mean it's 10 inches in an event or 15 inches in an event, something like that, would be my guess.

MR. SEE: If I may, the design, I think it's called the probable maximum precipitation, which is a defined event by the National Weather Service.

MEMBER RYAN: Right.

MR. SEE: They have a report called the HMR 51 and 52, which is an event that is not to be exceeded. So, it far exceeds any storm that has been experienced at the site.

MR. FINDILROKIS: So, this goes beyond any historic --

MEMBER BANERJEE: So, it's a Category 5 hurricane or something?

MR. FINDILROKIS: Probably a maximum hurricane, I guess, that you can expect.

If I may, I can get -- I'm looking at some numbers. I can give you an answer to the previous question regarding which nuclides are sensitive to fortification. So, primarily, there are three. One is, of course, tritium, which, of course, is not sensitive to fortification, but this is one that in the initial phase of the analysis exceeded the maximum permissible concentration.

And the other two are strontium and cesium. For cesium, for example -- and, again, I'm referring to just one of the pathways because, of course, for each pathway the numbers are a little different.

But for the pathway through the saprolite to Mayo Creek, for cesium, the ratio of concentration or the maximum permissible concentration, if one doesn't account for fortification, is 1.2. So, it's relatively close to 1.

For strontium, it's higher. For this particular pathway, it was 19.4.

MEMBER BANERJEE: This is through saprolite?

MR. FINDILROKIS: Through the saprolite, right. Right.

And, of course, for this, we have measured values based on laboratory tests for the KDs, and the concentration, of course, is significantly reduced if one accounts for fortification.

MEMBER BANERJEE: And how close is the strontium to what is permissible in terms of concentration?

MR. FINDILROKIS: Even after we account? Oh, it becomes very low. I mean it's --

MEMBER BANERJEE: After you take --

MR. FINDILROKIS: I mean it is practically zero. Practically zero because --

MEMBER BANERJEE: Now you talk about this as absorption, but is there a sort, in normal life where you use ion exchange columns, there is a breakthrough that occurs. Does such a phenomena occur here? You know, what happens is the absorption band travels, right? Does something like this happen in these problems? I mean, after all, this is like an ion exchange column, that's all it is, right?

MR. FINDILROKIS: Right. I think this would have been the case only if one had agents in the water, basically, like particles that would actually move --

MEMBER BANERJEE: So, this actually absorbs and stays there?

MR. FINDILROKIS: Right.

MEMBER BANERJEE: Because the band doesn't move, the absorption band?

MR. FINDILROKIS: Right.

MEMBER BANERJEE: It's not like a chromatographic column?

MR. FINDILROKIS: No. The nuclide is dissolved in the water. So, as the water comes in --

MEMBER BANERJEE: Right.

MR. FINDILROKIS: -- contact with the porous material in the case of the saprolite, then there is exchange, and it's absorbed.

MEMBER BANERJEE: And it stays wherever it's absorbed? You know, like in a chromatograph, the thing moves.

MR. FINDILROKIS: Part of it stays and part of it moves on. So, there is an --

MEMBER BANERJEE: I'm talking about the absorbed part.

MR. FINDILROKIS: Right. The absorbed part stays there, yes.

MEMBER BANERJEE: And it does not move? So, it's not like a liquid chromatograph? It doesn't take it out and move down?

MR. FINDILROKIS: I'm not sure exactly what you mean by liquid chromatograph, but --

MEMBER BANERJEE: Well, when you do chromatography, you know, you absorb stuff onto the resin, or whatever it is, and the absorbed band will tend to migrate down the column. Eventually, in any column, you get a breakthrough. The material comes through.

Now you may be absorbing it in some way which is not typically ion exchange. So, I don't know what sort of absorption you have. But I defer this to people like Mike, who know about what happens to radionuclides in --

MR. FINDILROKIS: Yes, in this case, I mean in the process, the absorption, the nuclides, basically, stay absorbed.

MEMBER BANERJEE: Wherever it is absorbed?

MR. FINDILROKIS: Right.

MEMBER BANERJEE: So, your chemistry fixes it in some way? It doesn't move?

MR. FINDILROKIS: That's correct.

MEMBER BANERJEE: Interesting.

MEMBER RYAN: It might help Dr. Banerjee if you tell him the three or four key radionuclides that may be a contributor at the release point.

MEMBER BANERJEE: Well, there's strontium, he said.

MEMBER RYAN: Well, strontium and technetium and iodine and, you know --

MR. FINDILROKIS: Right, strontium, cesium, and technetium is what it --

MEMBER BANERJEE: Well, technetium won't absorb significantly.

MEMBER RYAN: That's what I'm saying; it shows up at the release point.

MR. FINDILROKIS: The technetium is very low. We have very low concentration.

MEMBER RYAN: Yes, very low inventory.

MR. FINDILROKIS: In fact, I'm not even sure that -- I think that we have done --

MEMBER RYAN: Carbon-14 and --

MR. FINDILROKIS: I think we don't have any technetium in the mix here.

And for strontium, for example, the KD, the distribution coefficient, is fairly high. The measured is 38 in the saprolite.

MEMBER BANERJEE: This is for my own benefit. I'm educating myself here. So, this is interesting.

MR. FINDILROKIS: Maybe, by reference, we can give you some references to the process --

MEMBER BANERJEE: Yes.

MR. FINDILROKIS: -- the technical papers.

MEMBER BANERJEE: Well, I'll just read Tom Pickford's book. That will tell me.

MR. SUMMER: And the last slide, so we're to questions.

CHAIRMAN RAY: Anything else for these folks?

(No response.)

Thank you very much.

MR. SUMMER: Thank you.

MEMBER BANERJEE: I think it's still worth getting the table to look at.

CHAIRMAN RAY: If we're going to ask something, let's do it precisely then. Mike, Sanjoy was suggesting --

MEMBER BANERJEE: Yes, I think he pointed it out, but we should still get the tables to look at.

MEMBER RYAN: Yes, I think if you could just provide the tables you referred to, you know, of what contributed and what the key radionuclides were?

MR. FINDILROKIS: Sure. We can provide the number of the table, and maybe we can highlight those that --

MEMBER RYAN: Sure. You know, Sanjoy, then you and I can visit on it sometime during the day, will be fine.

Thank you.

MS. MONROE: The table you were reading the numbers from was 2.4-237.

CHAIRMAN RAY: So, Weidong, could you get with Amy and see if we can make copies and let these two guys talk, please?

MR. FINDILROKIS: And there are several tables because it was for a particular pathway. So, for other pathways, there are similar tables.

MS. MONROE: We will get together the appropriate tables and provide them to you.

CHAIRMAN RAY: Okay. Again, thank you.

MR. SUMMER: Thank you.

CHAIRMAN RAY: We turn to the staff for the next portion of the presentation.

MR. SEBROSKY: My name is Joe Sebrosky. As I indicated before, I am the lead Project Manager for the Safety Review.

Since this is the staff's first presentation, I just wanted to give the Subcommittee a broad kind of perspective on how the agenda was set up and what we have done to date.

If you recall back in July of this year --

CHAIRMAN RAY: No, we don't.

(Laughter.)

MR. SEBROSKY: Well, I thought I would go over it.

What we tried to do in one of the Subcommittee meetings in July is present the Subcommittee with some information that we thought would be of particular interest to them. And the information that we wanted to get in front of the Subcommittee first were the chapters that have high site-specific content, Chapter 2 and emergency planning. That was the thought.

If we go back to July, we did a portion of Chapter 2. Specifically, we did everything except hydrology. We did 2.0, which was the site characteristics; 2.1, geography and demography; 2.2, which is the hazards analysis; 2.3, meteorology, and, then, 2.5, which was the geology, seismology, and the geotechnical engineering.

Out of those presentations, we ended up with two action items, one associated with the toxic gas hazards analysis and another one associated with Section 2.5.

So, in continuing with the hierarchy on what chapters or sections we think may be of interest to the ACRS, that's why we chose 2.4 first, because it completes Chapter 2.

The next presentation is emergency planning, which is entirely site-specific. After that, the idea is to touch base on those two action items from the previous meeting and, then, go into a chapter-by-chapter discussion and concentrate on the site-specific information that's in those chapters. That's kind of the approach to the agenda.

And if you look, we try, when we get into the chapter-by-chapter discussions, not all chapters are created equally as far as information that may be site-specific information that may be of interest to the ACRS. So, we try to go through those chapters that we think may be of more interest than other chapters.

As you said, Mr. Ray, depending on how the day goes, there's a potential that we may move the second day presentations to the first day. The staff is prepared for that, if you so choose.

So, having said that, we would like to start with hydrology. To my right is Ken See. He's one of the NRC hydrologists. He is responsible for surface water.

Sitting at the table is Dan Barnhurst. Dan was responsible for the NRC's groundwater review.

And, then, we have three Pacific Northwest National Lab people that aided in the review: Lance Vail, Lyle Hibler, and Mike Farrar. Mike Farrar is going to be doing the groundwater presentation, and Ken will be doing the surface water presentation.

One of the names that I didn't mention is Steve Schaffer. I believe Steve is in the audience. I saw him earlier. He helped with the health physics portion of the groundwater review.

MR. SEE: Good morning.

My name is Ken See. I'm a Senior Hydrologist in the Division of Site and Environmental Reviews, they Hydrologic Engineering Branch.

I'm going to be discussing the first seven slides, which means the surface water, flooding topics for the VC Summer units.

As part of its review, the staff reviewed various flooding mechanisms and scenarios that were identified in the Final Safety Analysis Report by the applicant. Additionally, the staff postulated other mechanisms and scenarios that may generate large floods at or near the site.

After conducting our review, the staff agrees with the applicant in that the design basis flood for the site is that which is caused by the local intense precipitation described in Section 2.4.2 of the Final Safety Analysis Report.

Also as part of its review, the staff, through the RAI process, requested that the applicant provide additional mapping information to clarify the locations of cross-sections used to define topography that are discussed in the FSAR and to provide a better map of the sub-basin delineation.

Additionally, it was requested that the applicant develop a walkdown or inspection procedure prior to large storms to ensure the drainage system functions as described in the application. The applicant has agreed to provide this information, and this commitment is being tracked as a confirmatory item, 2.4.2-1.

MR. SEBROSKY: For the ACRS members, if you go to your next pack slide, it's a blowup of a color. You have a black-and-white and a color version of this. You should.

MR. SEE: We thank the applicant for this figure we've borrowed here.

Basically, this slide identifies the approximate locations of the major surface water features at or near the site that are impacted by various postulated flooding scenarios along with their respective flood elevations.

We see that the Monticello Reservoir to the north, indicated there, is a maximum operating pool elevation for 425 feet. The site grade, shown here, is 400 feet, and the datum is NAVD88, as well as the design basis flood which occurred from the local intense precipitation of 399.4 feet.

Additionally, we looked at -- and I'll talk about this a little later -- another flood mechanism that we have postulated in addition to what was found in the FSAR. It was a breach of the Monticello Reservoir, and that elevation was around 385 feet, if I recall. And the red line that you see on your figure shows Mayo Creek, which was the path of that postulated flood.

And the last two are the dam breach elevations identified in the application, and, then, the maximum operating pool elevation for Parr Reservoir.

In the application for the breach scenario for Parr, for the Broad River dam, the applicant didn't go into, if you looked at the slide, they didn't go into a lot of details. That information was withheld because it was considered to be sensitive information.

However, during the site audit, those

documents were provided for staff's review, and FERC, the Federal Energy Regulatory Commission, criteria were used in doing that analysis. And the staff was satisfied that the analysis was done appropriately.

MEMBER ARMIJO: In your analysis of that dam breach, did you assume any blockage in the channel downstream of the breach that could lead to higher -- basically, creating a debris dam?

MR. SEE: You're talking now about Mayo Creek?

MEMBER ARMIJO: Yes.

MR. SEE: No. We, basically, just look at the channel. I can't imagine -- I mean that's a huge channel. This is not something that's small. So, it was assumed that we had dense vegetation and trees, which is what you have there in terms of characterizing the reference. But it would take houses to be put there in order to really substantially affect the water surface elevation.

DR. HINZE: But there is no evidence of landslides?

MR. SEE: No. No.

As mentioned earlier, the staff does agree that the design basis flood is that caused by the local intense precipitation described in Section

2.4.2. The fact that this design basis flood is caused by the local intense precipitation is not unusual. Additionally, based upon our review of applications before the agency, the margin associated with this, which is in this case 6/10ths of a foot, is typical for a site.

The applicant used HEC-RAS for modeling the drainage system for the local intense precipitation. HEC-RAS is a commonly-accepted one-dimensional hydraulic model developed by the U.S. Army Corps of Engineers to estimate flood elevations. It is capable of modeling both steady and unsteady flow scenarios, and numerous applicants have also used this model.

During its review, the staff found that the results of the flooding calculations were sensitive to the assumed channel roughness values used in the analysis. In RAI 2.4.2-1, the staff asked the applicant to develop a program to ensure the drainage system works as intended, including an inspection prior to large storms.

Although many elements of the drainage system, such as culverts, were assumed to be blocked during the design basis event, the analysis assumed roughness values corresponding to a well-kept, properly-maintained vegetation.

Additionally, roadways that may be flooded during the design basis event will behave as broad crested weirs controlling the depth of water. So, if cars and trucks are parked on those roads, this would likely cause an increase in flood issues.

Additionally, in RAI 2.4.13-14, the staff requested the applicant provide a map of the site showing the locations of the cross-sections used to define the topography and to include it in the Final Safety Analysis Report. These cross-sections and their locations, as asked earlier, I believe, are important because they are the basis for defining the site topography in the HEC-RAS program used for calculating the flood elevation.

So, potentially, if someone wanted to bias the results, you could select your cross-sections in a way to give you a favorable result or a non-favorable result. So, what we were checking for there is to make certain that the cross-sections were located such that they actually represented the topography of the site.

MEMBER BANERJEE: Isn't there also a roughness or something needed to do the calculation?

MR. SEE: Yes, the roughness values for

the calculations, yes. We did sensitivity stats, which is part of the basis for asking for an inspection program. Because if they don't maintain, they don't cut the grass, they let the weeds grow up, the construction materials may accumulate over time, that type of scenario was not accounted for in the model.

MEMBER BANERJEE: So, the junk left, debris, or whatever?

MR. SEE: Right. Right. They did an analysis to show that in certain areas, if that was the case, it could lead to a problem. That is why we asked for this procedure.

And this is pretty common. My understanding with other applicants for operating units, they have procedures similar for this.

DR. HINZE: Did you consider flood erosion and changing the cross-sectional area?

MR. SEE: Not for the local site. Channel erosions or other areas --

DR. HINZE: During flooding.

MR. SEE: During flooding?

DR. HINZE: Right. High velocity.

MR. SEE: No. No.

DR. HINZE: Is there any evidence that

that does take place from events that have occurred in the area?

MR. SEE: Well, the site has yet to be built, but the channels will be grass-lined and things of this nature. And the design basis event is of short duration. The PMP is 6.1 or 6.2 inches of rain that falls within five minutes.

DR. HINZE: Yes.

MR. SEE: So, it's a pulse of water moving through the system. If any erosion were to occur, it would be very difficult to predict that.

DR. HINZE: But your conclusion is that flood erosion is not a factor or --

MR. SEE: Not a factor.

DR. HINZE: -- you can't calculate it?

MR. SEE: I don't think it's a factor based upon the velocities that we were looking at.

DR. HINZE: Considering the gradients here?

MR. SEE: Considering the gradients, yes.

DR. HINZE: Yes. Okay.

MR. SEE: Yes.

In addition to the breach of the Parr Shoals Dam, as discussed by the applicant, the staff also considered the possibility of breaching the berm between the Monticello Reservoir and Mayo Creek east of the proposed site. The values used on this analysis were obtained from the Bureau of Reclamation Dam Safety Office documents, but these values were then increased for additional conservatism.

These four values were then used in a HEC-RAS model, assuming steady-flow conditions. The flow level near the site for this scenario is approximately 8 feet below the site grade of 400 feet.

Based on the staff's review of various flooding mechanisms, such as the local intense precipitation, probable maximum flood, and dam breach scenarios, the proposed site is considered a dry site and no flood protection is required.

This is the end of the slides on the surface water topics. Mike Farrar and I will discuss the remaining slides that deal with groundwater topics.

MEMBER ARMIJO: Before you leave that, I just had one quick question here.

MR. SEE: Sorry. Uh-hum.

MEMBER ARMIJO: The intense precipitation peak elevation is 399.4 feet compared to the 400-foot site grade. Those two numbers are essentially identical, right? So, what's the significance of had it been over 400 feet by a foot or two?

MR. SEE: The AP1000 Design Certification Document has a limit of 400 feet. They call it 100 feet. So, it's an absolute requirement.

We have asked questions of Westinghouse. Okay, what's the impact if it goes over a foot or not? And Westinghouse has come back and said, no, there's an absolute limit not to be exceeded.

MEMBER ARMIJO: Which gives you pause. When a number comes so close to an absolute limit, there's got to be uncertainties; there's got to be uncertainty. I'm just wondering, does that 399.4 have a lot of conservatism in that calculation?

MR. SEE: Yes. Yes, we did sensitivity studies, basically, because it is close. But it's also very typical. That's why I mention it in this slide.

MEMBER BROWN: That's the .6 feet you were --

MR. SEE: Yes, sir. Yes, sir. Sort of think of this as a drainage system by design is located near the plant. I mean you can't, unless you're going to have something with a really, really steep dropoff, and it wouldn't be practical, but based upon the sensitivity studies that were done, we have a lot of confidence that that value --

MEMBER ARMIJO: So, unless your drainage system gets blocked or something like that --

MR. SEE: Well, we assume that it does get blocked. When doing this analysis, this 399.4 assumes all the culverts are blocked.

MEMBER ARMIJO: Oh, okay.

MR. SEE: And basically, you have an overland flow scenario and the water will overflow the roads and behave as weirs, if you will.

MEMBER ARMIJO: Okay.

MR. SEE: So, that's very conservative. Plus, like I said, the event itself, 6.1 inches of rain in five minutes is 70-some inches of rain an hour, if I just round it up.

MEMBER ARMIJO: So, there's a lot of margin?

MR. SEE: Yes. But I did want to point that out because you were correct in that, hey, that seems pretty close. Yes.

MEMBER ARMIJO: Thank you.

MR. SEE: Sure.

MR. FARRAR: My name is Mike Farrar. I have a background in soils and subsurface science.

Staff reviewed the hydrogeological characteristics of the site provided by the applicant, and the applicant-measured characteristic properties, identified conceptual models, and estimated direction velocity of contaminants, determined a maximum groundwater level would remain below the DCD requirement. Through a series of RAI requests and phone conversations, staff reviewed those characteristics and properties, concluded that they were sufficient to support both the conceptual models that were identified and the maximum groundwater elevation that was in the FSAR. Staff established confirmatory item 2.12-1 to verify that information would be included in the next revision of the FSAR.

That's the extent of that one. Next slide.

Staff reviewed the postulated accidental release from the radwaste management system, potential effects on groundwater and surface water, evaluated the ability of the environment to delay, disperse, dilute, or concentrate the effluent. And again, through a series of RAI requests and conversations, staff determined that the release and pathway analyses were acceptable. They examined up to 10 conceptual models, plausible conceptual models.

Staff reviewed the results and determined concentrations were below the acceptance criteria in

Branch Technical Position 11-6, and the staff has decided that the FSAR section or their review has been completed.

MEMBER BANERJEE: You know, I have nothing to compare to in my mind, but is this site in terms of proximity to water and the topography plus -- what was the name of that zone? You called it -- I've forgotten now. Saprolite. Right. Is this sort of similar to the original two reactors that are there in terms --

MR. FARRAR: You mean the existing reactor?

MEMBER BANERJEE: Yes, the existing reactor.

MR. FARRAR: I can't speak to the existing reactor. It is located right on the reservoir. So, it is going to have a different hydrology.

MEMBER BANERJEE: The distances, are they about the same to te water?

MR. FARRAR: Well, it's certainly further from the water and it's located --

MEMBER BANERJEE: This is further?

MR. FARRAR: -- at an elevation above certainly the Parr Reservoir. And it's on a ridge. It's just not consistent with Unit 1 that exists right now.

MEMBER BANERJEE: So, would you say that the conditions were less demanding in this plant than for the others in terms of concentrations of --

MR. FARRAR: If I understand what you mean by less demanding, I would agree.

MEMBER BANERJEE: Yes. So, accidental releases would be expected to lead to lower concentrations coming from these units?

MR. FARRAR: Certainly. With the dilution in the Parr Reservoir, it's an incredible dilution effect.

MEMBER BANERJEE: I see.

MR. SEE: The Parr Reservoir fluctuates almost daily, I think on the order of 10 feet, you know, pumping water between it and Monticello Reservoir, which varies by about 4 feet, if I remember correctly.

MEMBER BANERJEE: Okay.

MR. SEE: So, there's a lot of mixing going on over there.

MEMBER BANERJEE: I see.

DR. HINZE: The saprolite, is there much anisotrophy in the permeability? Are there any more less permeable zones within it? Tell us a little bit about that, how it would impact the groundwater.

MR. SEE: Sure. It is recognized that there is variability, both anisotrophy and preferred flow directions. The applicant has measured conductivity in a variety of locations. So, they have assembled a distribution of permeabilities and have used something on the order of the 75th percentile K to calculate your transport. So, they’re at the upper end of the K range. So, they may not be able to represent the entire distributions or know it precisely, but they can at least be conservative and take a high K value to the event calculation.

DR. HINZE: Is there any particular direction that varies, a higher permeability? Is it off the hill or is it perpendicular?

MR. SEE: I think just the topographic driver is the most important thing.

DR. HINZE: Important both --

MR. SEE: Yes.

DR. HINZE: Simply with the topography on the bedrock, right?

MR. SEE: That is correct.

DR. HINZE: Yes. Okay. And the net result is that there is conservatism, then, in the permeability values that have --

MR. SEE: That is correct.

DR. HINZE: Uh-hum. Okay. Thank you.

MR. SEBROSKY: That ends this portion of the presentation.

CHAIRMAN RAY: All right. Thank you, Joe.

Any other questions for the staff?

(No response.)

Okay. Now, before we go to Item 4, which we're going to then be making a transition that Joe explained to emergency planning, I want to -- again, I have talked to a couple of the Members, but I want to make sure you are prepared, probably before lunch, to indicate items to Vogtle that you would wish to get some more input from, if it is available, in advance of our writing a letter this week on the Vogtle RCOLA, so that they can have a few hours to respond, perhaps tomorrow, maybe later today, to those questions and get any information that may yet be useful to the Subcommittee's recommendation to the full Committee.

So, if there is anything that you are wishing you had information about, please formulate it in a way that they can take it and respond.

Okay. With that, we will proceed with the Agenda Item 4. The applicant will talk to us about Chapter 18 and emergency planning.

Amy?

MS. MONROE: Okay. In 13.3, we discuss emergency planning, and Mr. Tim Bonnette, who is with our Emergency Preparedness Group, is going to talk to you all.

MR. BONNETTE: Good morning.

As Amy said, I'm Tim Bonnette with the Emergency Preparedness at VC Summer.

The presentation today will discuss our DCD departure, the emergency plan design site layout, our command-and-control emergency facilities, the emergency response, the emergency planning zone, and then our offsite education and alerting.

Our DCD departure, VCSDEP18.8-1, is a departure from the locations of the Technical Support Center and the Operational Support Center. The Technical Support Center will be located in the new nuclear operations building, which is a building that we will start construction by Unit 1 in March of this year and we will complete construction in mid- to late 2012. It will house the Unit 1 Technical Support Center. As Units 2 and 3 come online, that Technical Support Center will then support those units as well.

Each of the Emergency Operational Support Centers will be located in the respective annex buildings, and they will be located in the DCD designated area for the Technical Support Center. So, those are two departures.

Our emergency plan design is in accordance with NUREG-0654 and FEMA-REP-1, Rev. 1, 10 CFR 50.47 and 10 CFR 50, Appendix E. Our emergency action levels will be developed with accordance with NEI-07-01, Rev. 0. And we have proposed a license condition to develop these EALs in accordance with this document.

Our site layout consists of a single nuclear exclusion area.

CHAIRMAN RAY: Excuse me. Why did you propose a license condition? Is that normal or is there something particularly different here that requires you to have a license condition requiring that you do that?

MS. MONROE: There wasn't anything in the regulations that required the timing of it. So, we tend to put license conditions when there is nothing else that --

CHAIRMAN RAY: So, this would be true for anyone in your situation?

MS. MONROE: Correct.

MR. BONNETTE: Okay. Thank you.

The single nuclear exclusion area has two ingress and egress points, one south of the plant and one east of the plant, and we have a map in this following slide to show you how it's laid out.

This site will have dual protected areas, one protected area for Unit 1 and, then, a single protected area for Units 2 and 3.

CHAIRMAN RAY: And how does that affect the combined TSC's function, if at all? In other words, if, for some reason, someone wanted to go from the TSC to either Units 2 or 3, they would have to pass out of one protected area and into another one.

MR. BONNETTE: With the Technical Support Center being outside of both protected areas, what we would do is, when we leave the facility, they would leave and go into the protected areas. It's outside of actually both protected areas.

CHAIRMAN RAY: I see. Okay. I didn't pick that up when you said it was being built at Unit 1.

MR. BONNETTE: Okay. And we also have, later in the presentation, a presentation that shows you the exact location of where the Technical Support Center is on this map.

CHAIRMAN RAY: Okay.

MR. BONNETTE: The exclusion area is the

yellow and magenta boundary here with Unit 2 and 3 being down here and Unit 1 being at the top north of it.

There's an ingress/egress point here, and, then, the second ingress/egress point here on the map. So, it's south and east of the site itself.

MEMBER ARMIJO: Could you explain why the exclusion area boundary is so large for Unit 1 and so much smaller for Units 2 and 3?

MR. BONNETTE: Bob?

MR. WILLIAMSON: Bob Williamson. I'm the Emergency Planning Manager for VC Summer.

We are using the existing exclusion area for Unit 1, which is specified to be a mile. As I recall, the exclusion areas for Unit 2 and 3 were specified in the DCD COLA to be smaller. So, that's the reason why.

MEMBER ARMIJO: So, it came from the DCD?

MR. WILLIAMSON: That's correct.

MR. LaBORDE: The original Unit 1 --

CHAIRMAN RAY: You have got to go to the microphone and identify yourself, and all that stuff.

MR. LaBORDE: My name is Jamie LaBorde.

The original Unit 1 exclusion area, when we located the two new units, they were basically almost at the line. We took the input from the DCD, expanded it just very slightly, and added that circle, if you will, onto the existing circle to get the snowman-type shape.

The DCD requirement was roughly a half-mile, I guess from the center of the reactor building. What we did is we went from the centroid of the two units out about 3390 feet or 3350 feet -- I can't remember which -- but to encompass the site and be slightly conservative compared to the DCD requirements.

MEMBER ARMIJO: Okay. I understand what you did, but I don't understand why a half-mile is okay for a two-unit location and a one mile for one unit.

MR. LaBORDE: When we selected the exclusion area for Unit 1, I'm not sure exactly what the parameters were and when we selected it. So, we may not have had all the design complete on Unit 1 when we selected that boundary.

MR. CUMMINS: So, this is Ed Cummins from Westinghouse.

The half a mile, the source of that was the URD, the Utility Requirement Document. And I'll say it's arbitrary. It was in the URD as a place that they wanted you to calculate your site doses to. And so, people don't have to follow this half a mile, but if they don't follow that half a mile, they have to calculate new doses. So, there's not really much other than that's the place where we calculated in the DCD our doses at a half a mile.

CHAIRMAN RAY: Okay. Standard design versus non-standard design. The two things intersect here.

MEMBER BROWN: So, the URD dictates the half-mile?

MEMBER RYAN: It doesn't dictate it.

MR. CUMMINS: The URD -- "dictates" is too hard a word.

MEMBER BROWN: Okay.

MR. CUMMINS: The URD says --

MEMBER BROWN: The basis for the dose calculation, how's that?

MR. CUMMINS: Yes, yes.

MEMBER BROWN: Okay. Thank you, Mike.

CHAIRMAN RAY: Okay. Proceed.

MR. BONNETTE: Our command-and-control in the emergency plan is discussed in four different cases. The first case is an activation of our entire emergency response organization in which the command-and-control of the emergency will be distributed between the Technical Support Center, the emergency operations facility, the Operational Support Center, and our control rooms.

In an event that affects only a single unit, then the affected unit's control room will have the lead for the emergency until our emergency response organization is activated.

For an emergency which involves the entire site, our existing Unit 1 control room will be the lead control room until our emergency response organization activates.

And, then, for an emergency which affects only Units 2 and 3, then Unit 2 will have the lead; that control room will have the lead for the emergency until the emergency response organization is activated.

Our emergency facilities consist of three control rooms, the existing Unit 1 control room, and, then, Units 2 and 3 control rooms located as per the DCD design.

There are three Operational Support Centers, the existing Unit 1 OSC and, then, the Units 2 and 3 OSCs in the respective annex buildings on the DCD 117.6 elevation. And this is, again, where we took the departure from the DCD.

MEMBER BROWN: So, it is the old TSC location in the DCD? You had this in your departure. I'm just trying to rephase it to make sure. So, this is the location of the old TSC before you moved it outside the protected area?

MR. BONNETTE: That is correct.

MEMBER BROWN: From the DCD?

MR. BONNETTE: In the DCD design of TSC, it will be our OSC.

Our Technical Support Center will be common for all three units. It will be located outside of both protected areas, but within the nuclear exclusion area.

It gives us a single-point emergency response organization command-and-control center for onsite evaluations, mitigation actions, and activities. It will be located in the basement of the new nuclear operations building, which will be controlled through security access card readers, and it also has an independent diesel generator for backup power and an independent ventilation system with high-efficiency particulate air filters and also charcoal filters. It meets the requirements of 0696 with the exception of being adjacent to the control room.

The data and communication links between each of the units and the Technical Support Center are in accordance with our cyber security plan, and within the nuclear operations building itself, the data and communication links for the Technical Support Center are separate from the first and second floors of the building itself.

MEMBER BROWN: Would you repeat that again?

MR. BONNETTE: Sure. The data and communication are in accordance with the cyber security plan, and the data and communication for the Technical Support Center, they are in independent rooms and down in the basement, as compared to the first and second floors, who are on the first and second floors.

MEMBER BROWN: Are they on an independent communications link or on the same --

MR. BONNETTE: They are on the same link, but once they get into the building, they split and a section goes to the Technical Support Center, and then a section goes to the first and second --

MEMBER BROWN: We had this discussion on one of the other designs, and I think Amy was --

CHAIRMAN RAY: Well, it's the reference COLA.

MEMBER BROWN: Yes, the reference COLA. Thank you.

Where the data communication from the plants was sent via the level 2 business or corporate level, which is still a little fuzzy in my own -- it's not fuzzy, but it's of a concern, which we have to address how we are going to deal with that in terms of corruption and ensuring that the locations have, even though it's a support center, it's not a command center, that if they're getting consultation, that they have the same data that they're looking at, and it hasn't been corrupted by hackers. After the very sophisticated Stuxnet worm operation where they actually -- just an amazing set of programming to do that or hacking.

The idea would be, if somebody corrupts it or builds it, then they could have different data, and the consultation ends up being not very valid. So, not a command-and-control issue, but, in other words, they don't have the same information from the main control room to there. So, that's of interest, how you all are doing that as well.

But that's not dictated explicitly, I don't think, in the DCD. Correct me if I'm wrong, but that is up to you all as to how you all handle that relative to the cyber security approach that you do for the site?

MR. BONNETTE: That's correct. And, actually, in our presentation we've got some information in here that will show how we would address, if the communication links even failed. Our emergency plan is set up --

MEMBER BROWN: I'm not worried about the failure. I'm worried about corrupted information --

MR. BONNETTE: Right.

MEMBER BROWN: -- information getting to the TSC that, then, is different from what the main control room is sending, supposedly.

MR. BONNETTE: Right. That mechanism will also, if there was corrupted data, we have emergency positions, the emergency response positions in place. They are designed in the emergency plan and already in place for Unit 1 where we have a person in the main control room that is on constant communications with the Technical Support Center. And the person in the main control room is evaluating the operational actions and the data within the control room itself to ensure that the Technical Support Center is seeing both accurate and timely information.

CHAIRMAN RAY: So, that is a way to detect corruption, is what he's talking about.

MEMBER BROWN: Yes. I got that. Is that specified in your cyber security plan, in other words, how you execute that?

MR. BONNETTE: I do not know that the details of that are in the cyber security plan. I don't know --

MEMBER BROWN: I mean it's an interesting discussion you just went through, but if it's --

MR. BONNETTE: Yes, I do not --

MEMBER BROWN: -- you would like to do it this way, but what do you really do? I mean, where is that kind of cast in concrete?

MS. MONROE: The cyber plan, we use the same standard, I'll call it cyber plan, that the AP1000 group has developed. The information as to how we deal with it from an emergency planning prospect is contained in the emergency plan, not in the cyber plan.

MEMBER BROWN: Yes, that was a question I had. I looked for that. You all said that in the part of your -- I've forgotten which part it was, the volumes of data.

Do we have the emergency plan that was Part 5 or something like that of the --

MS. MONROE: Yes, you should. It was part of our application; our entire emergency plan was included.

MEMBER BROWN: I will look in the data that I got. I don't have it; I don't have it. I had 1 through 4 and a few other ones, but I didn't have 5. So, I couldn't go look at it.

MS. MONROE: We have it available on a disk today, if you would like to see it.

MEMBER BROWN: Well, we'll get it via whatever the appropriate vehicle is. I'm not asking you to do something different.

Obviously, I have some interest in that relative to the cyber security aspects of this.

And we can go on, Harold. I just wanted to --

CHAIRMAN RAY: Yes. Well, I think, Charlie, that that certainly is an item on our list for the reference COL. Maybe the more pertinent thing here is, to what extent Summer is constrained by what's in the reference COL in this respect versus what they could choose to do on their own. And it sounds to me like what they just described was something that they could do as a means of identifying corrupted data, for example.

MEMBER BROWN: Yes.

CHAIRMAN RAY: That's something that they are not constrained by the reference COLA to do it that way. They could do it the way that they are proposing or do it the way Vogtle is doing it. They can do it the way they want to do it, because it's a choice that they can make, I would think.

In any event, this is an issue, as you say, that we have not yet resolved. I think we will return to it, at least briefly, when we go through whatever it is that we may want any further information.

MEMBER BROWN: Yes, that's the one item I would bring up later, but we can go on. I wanted to just get a feel for what you all were doing. That's why I addressed it, since you brought it up.

MR. BONNETTE: And I will go back through it one more time a little bit later in the presentation.

Our Technical Support Center, this is the map that we were talking about a little earlier.

MEMBER BROWN: I am going to make one observation --

MR. BONNETTE: Yes, sir.

MEMBER BROWN: -- relative to your

approach in terms of having people communicate.

MR. BONNETTE: Yes, sir.

MEMBER BROWN: I presume that communication would, then, be independent of however the data is getting transmitted between the main control room and the Technical Support Centers or other locations. In other words, that in itself is not a look at a computer screen; it's talking to somebody via some other independent means where they can say, "This is what we're seeing. Is that what you're seeing?"

MR. BONNETTE: Yes, that's what it is. It is a member of our emergency response organization, not a person on our operational staff. It is an emergency response position --

MEMBER BROWN: It's a means of doing it, not the person, but the means of doing it has to be independent of the ability to have that data get corrupted when it gets -- via this business network or corporate network, whatever it is?

MR. BONNETTE: That's also correct. He is looking at the control board and the operator actions, and he is comparing the data that is being communicated to the TSC.

MEMBER BROWN: Verbally or orally --

MR. BONNETTE: Verbally.

MEMBER BROWN: -- with somebody?

MR. BONNETTE: That is correct.

MEMBER BROWN: That's the difference. Not just looking at the same screens? I mean, excuse me, not talking via the same pathway, which could be hacked itself?

MR. BONNETTE: Right.

MEMBER BROWN: That's all I'm talking about. Thank you.

MR. BONNETTE: Okay.

MEMBER BROWN: I'm sorry, Harold. Thank you for the forbearance here.

CHAIRMAN RAY: Okay.

MR. BONNETTE: This map shows the protected areas. They are not exact. This is the protected area for Units 2 and 3, and the protected area for Unit 1 will be in this area.

The Technical Support Center will be located in the new nuclear operations building in this area outside of both protected areas.

MEMBER BROWN: Where is the protected area on that diagram? I was trying to relate it to your previous pictures, and I kind of lost the bubble here. I thought that nice, hard line was the protected area, and it's obviously not.

MR. BONNETTE: It's not. This is actually an access road on the site. The protected area for Unit 1 would be in this area up here.

MEMBER BROWN: Okay. All right. That's fine. Thank you.

We also incorporated the human factors engineering into the Technical Support Center to support an emergency at either one, two, or all three of our units. And we have a centralized command area with adjacent support areas for engineering, radiological monitoring, for unaffected unit personnel, for briefings, for the Nuclear Regulatory Commission, and also in this facility we have a backup Operational Support Center.

The human factors engineering includes adequate workstations and multiple computer and projection components which allow us to separate each unit's data displays and the evaluation capabilities in the facility itself, so that we can distinctly tell which site's data is on which display in our facility.

The emergency response positions that we were talking to a little bit earlier, again, are located in the Technical Support Center and in each of the control rooms. And that is again an independent look from the operations staff, looking behind them at the control board and, then, talking to the Technical Support Center to ensure that we've got constant communications and a common bridge for us to be able to evaluate the data and communicate the actions that are taking place.

CHAIRMAN RAY: Wait a minute. Back up, please.

I am interested in your use of that term "command area".

MR. BONNETTE: Yes, sir.

CHAIRMAN RAY: Where does that term come from?

MR. BONNETTE: It is the term that we use for the centralized area. And actually, the next slide will actually show what we are talking about.

MEMBER BROWN: Well, I'm looking at it from a functional standpoint because we had this debate a month ago as to whether or not the TSC performs any command functions. This has to do with cyber security.

Why do you call it a "command area"?

MR. BONNETTE: Well, each of our facilities has some element of command-and-control in their evaluation of the emergency.

CHAIRMAN RAY: I understand.

MR. BONNETTE: The overall command-and-control is the -- and we'll talk about this; we've actually got in the emergency response how the command-and-control is laid out. The overall command-and-control for the corporate emergency is in our emergency operations facility. And, then, the operational portion of it is in the control room with the TSC being the support.

CHAIRMAN RAY: Okay. You understand, don't you, that by calling it a command area, you imply that there is a risk that some incorrect command will result from corrupted data?

MR. BONNETTE: I do understand that, by calling it that, I think it's just a term to say that this is the area of the facility that has the lead, is the way we're using it.

CHAIRMAN RAY: Because those of us who operated plants in the wake of TMI would have never ever used that word for anything going on in the TSC. And I'm trying to find out if there's some migration of thinking here in which you have licensed personnel in the TSC telling the control room what to do.

MR. BONNETTE: Our emergency --

MR. WILLIAMSON: Tim? Again, Bob

Williamson, Emergency Planning Manager for SCE&G.

The actual operational command-and-control does remain in the control rooms. The Emergency Director in the emergency operations facility and the Emergency Plant Manager in the Technical Support Center do not take command-and-control from the control rooms.

CHAIRMAN RAY: But I'm telling you that, by calling it that, you create this concern that exists here about the integrity of the data that they're relying on, and that goes to the cyber security plan.

MR. WILLIAMSON: We understand your concern. Again, what he is referring to as command or command area is just the information that the architects who were designing this facility called it, and it's not to imply that we're transferring command-and-control from the senior reactor operators in the control rooms.

CHAIRMAN RAY: Well, that is the area of concern. I think, just for everybody's information, ACRS has got enough of a concern about this that we are probably going to want to deal with it perhaps on a generic basis to try to better understand what is taking place as time goes on here.

Because, like I say, I asked the question and the answer was given in what to me is a very unsatisfactory way because it is just an anathema to think that somebody in the TSC is going to command anything. But it is something we need to talk about.

Okay. Go ahead.

MR. BONNETTE: Okay. In the picture we have up here is a layout, a conceptual layout, of the Technical Support Center, showing this area here as the primary area or what we're calling the command area, with the support areas adjacent to it in the facility. And these areas are glass walled areas so that they can continuously monitor the projections that are up as well.

CHAIRMAN RAY: It looks a lot like an EOF.

MR. BONNETTE: It does look a lot like an EOF, and we did that deliberately so that we would have the element of control within the facility centralized and, then, the support area outside. It is very similar to our EOF.

CHAIRMAN RAY: Okay.

MR. BONNETTE: Our emergency operations facility is an existing facility. It was completed by Unit 1 and moved into in October of 2009, at which time we actually demonstrated our biannual exercise with an NRC staff response to the facility itself, and we were successful in doing so.

Again, it's common for all three units. It is set up for single or multi-unit emergencies and contains the support areas for the offsite radiological monitoring, the Nuclear Regulatory Commission personnel, state and local officials, briefing areas, security planning areas, and offsite communication areas.

The facility is also designed to have a remote Technical Support Center and a remote Operational Support Center for an event that precludes access to the site.

The Joint Information Center is also located at this facility, and it has a public information area and media area, both for the corporate, state, local, and federal personnel.

MEMBER BLEY: And this is just for communicating with the outside world?

MR. BONNETTE: That is correct.

MEMBER BLEY: Okay.

MR. BONNETTE: This is a picture of our emergency operations facility. The front area here, it's a gated, controlled facility all the time. In an emergency, we'll open the outer gate, and this area and this parking area will be for media and offsite personnel. In the rear of the building, in another gated area, is where the emergency response organization will park, and they will enter through the rear into the emergency operations facility.

Internal to the building are card reader separations for security controlled areas separating the emergency operations facility from the Joint Information Center.

In our emergency response, in an unusual event classification, the lead control room that we discussed earlier, the shift supervisor becomes the Interim Emergency Director. And he is supported by his shift staffing and the staffing from the unaffected units. And additional staffing may be called in as his discretion.

All activities are controlled through the control room or by assigned personnel appointed by the IED. Escalation to a higher emergency requires us to activate our entire emergency response organization.

At an alert, a site area emergency, or a general emergency classification, the control room Senior Reactor Operator is the lead for operational plant monitoring and operational controls. The Technical Support Center is the lead for onsite evaluations and decisionmaking for mitigation strategies, but in collaboration with the control room Senior Reactor Operator.

MEMBER BROWN: You just throw up your hands, like I do?

CHAIRMAN RAY: Yes. Anyway, go on.

MEMBER BROWN: Those magic words “take the lead”.

CHAIRMAN RAY: Yes, I find that shocking. But okay.

MR. BONNETTE: The emergency operations facility takes the overall corporate command-and-control, and they have the lead for making protective action recommendations, notifying the offsite authorities, and also doing the offsite radiological monitoring.

The Operational Support Centers will be the support personnel that will actually do the in-plant --

MEMBER BROWN: Is this out of the DCD again?

MR. BONNETTE: No, sir. This is an site-specific out of our emergency plan.

MEMBER BROWN: This is just a site-specific Summer-type -- okay.

MR. BONNETTE: That's correct.

MEMBER BLEY: And the emergency plan is already there for Unit 1. So, are you making changes to that as a result of Unit 2? Or are they just --

MR. BONNETTE: If you look at the Unit 1 emergency plan and you look at the Units 2/3 emergency plan, there are some changes because of the multi-unit, but as far as the organizational structure goes, it essentially remains the same.

MEMBER BLEY: Okay.

MR. BONNETTE: The Operational Support Center will manage or implement the in-plant mitigations and do the onsite evaluations for public health and safety protection.

And, then, the Joint Information Center, as we discussed earlier, will be the interface between the media and the public.

MEMBER BLEY: Can you go back to that one? Okay. Go ahead.

MR. BONNETTE: Our Emergency Planning Zone will remain the same as what is currently in place for Unit 1. The boundaries of the Emergency Planning Zone are determined by the population demographics, by topography, by local jurisdictional lines.

And the current Unit 1 Emergency Planning

Zone includes special needs populations such as schools, medical facilities, assisted living facilities, and daycares that are close to, but may be outside of the 10-mile radius of a circle from the plant.

And this has been looked at by the State of South Carolina. We have a letter from them stating their acceptance, and we also have County resolutions from our risk counties stating their acceptance of this Emergency Planning Zone. And it has also been reviewed and accepted by FEMA.

And this is a map of our EPZ. And you can see that it is a 10-mile circle from Unit 1, and then Units 2 and 3 are also shown here. The EPZ is divided up into the sectors for population evacuation and sheltering.

Offsite education. What we want to do is we want to make sure that we keep our public up-to-date with what they need to do in the event of an emergency. And we do so using a calendar which includes a map like you just saw for our Emergency Planning Zone. It includes the evacuation sector boundaries, both in map and in description. It includes evacuation routes in a map and a description. It includes public action guidance and shelter and welcome center locations, and also includes what local radio and television stations can be tuned into to get information for an emergency.

We train the offsite emergency responders -- oh, excuse me, let me back up. The calendar also includes a special needs assistance card. And what this is is a card that any resident that has a special need during an evacuation can fill out some information. They send the self-addressed, postage-paid card back to VC Summer. That card is then given to the applicable counties for their emergency planning purposes to provide the special needs assistance.

From an emergency response standpoint, we train all of the local law enforcement, the fire, and the EMS personnel in basic radiological information and training, and we also train the State Emergency Management personnel, Highway Patrol, State law enforcement, and also Department of Natural Resources personnel that will be first responders in the area.

For offsite alerting and notifications, VC Summer has an emergency notification form which was provided to us by the State of South Carolina. This form is filled out and provided to the State of South Carolina and our risk county emergency management agencies within 15 minutes of the declaration of an emergency. It's also used to provide them updates every 30 to 60 minutes following the previous notification form being sent out.

VC Summer also uses an electromechanical siren system to alert the public. We have 106 located throughout our Emergency Planning Zone. These sirens are battery-powered with solar chargers, and they are operable without AC power assistance. They are sounded at a site area emergency and at a general emergency after we consult with the State and local personnel to ensure that they have the emergency messages prepared and that they have their shelters set up, and that they are ready for public notification and public response.

The State and local officials will use backup route alerting. In the event that one of our sirens fail, they will dispatch local emergency response personnel to use their vehicle public address systems to alert the public in that area as to what needs to be done as far as public actions and to listen to the radio stations.

MEMBER BROWN: How do you know it has failed?

MR. BONNETTE: How do we know? We have a

mechanical feedback system or an electrical feedback system on our sirens that monitors the rotations of them, the pressures of them, and the actual electronic parts of it that will feed back to us.

MEMBER BROWN: By wire?

MR. BONNETTE: Radio.

MEMBER BROWN: Radio? And the radio is fed by chargers off those same batteries?

MR. BONNETTE: That is correct.

MEMBER BROWN: And if those batteries fail in any particular location, does that leave the whole area open?

MR. BONNETTE: What we will do is we will actually get a notification that that siren has lost communications, and we can dispatch --

MEMBER BROWN: And so, there is a process for that?

MR. BONNETTE: That is correct.

And, then, also, the State will use the Emergency Alert System to make the emergency tone across the media networks and to provide the emergency message as to what public actions need to be taken.

Are there any additional questions?

MEMBER BLEY: Do the State and county emergency folks have space within your EOF or you just have communications with them to their own facilities?

MR. BONNETTE: Actually, we have both. They have a designated area within our emergency operations facility to support the EOF staff. And, then, they also have space in the Joint Information Center independent of it, and, then, we also have the communications networks.

CHAIRMAN RAY: Could you go back to 16, please?

So, since we are on a quite short schedule here, I don't mean today, but I mean overall, I just want to dwell on this second point here about the TSC. "Takes the lead in the onsite evaluations and decisionmaking for mitigation strategies." Leave off the part about collaboration with the control room right now.

I'm trying to figure out what that means. Mitigation? I assume you're talking about mitigation not offsite, but mitigation onsite?

MR. BONNETTE: That is correct.

CHAIRMAN RAY: So, they have the lead to decide what mitigation strategies should be followed?

MR. BONNETTE: That's right. In the Technical Support Center are the engineering personnel. There's additional operations personnel, and, then, there's like our Plant Manager and senior plant staff that are there to look at the emergency, evaluate the emergency, and then put together what direction we want to try to move forward, in collaboration with the control room.

CHAIRMAN RAY: Okay. Let me ask it a different way. According to your training and your admin procedures and your general emergency procedure, can those folks in that position, which include the key people in the company, direct the operators in the control room to take specific actions?

MR. WILLIAMSON: Tim, let me interject.

MR. BONNETTE: Go ahead.

MR. WILLIAMSON: We have site-specific procedures currently in existence for Unit 1 that specify that only the duty shift supervisor, who is a senior licensed reactor operator on shift, can make those decisions. Those same procedures will carry over for Unit 2 and 3 as well.

So, when we talk about the lead in mitigative strategies, we are talking about the specific items addressed in NUREG-0654 for transferring certain engineering administrative issues over to the Technical Support Center. We're not talking about the operational aspects of running the reactor.

CHAIRMAN RAY: Does those words sound like that to you?

MR. WILLIAMSON: Looking at the slides, I can understand some questions on that activity. But, again, we are trying to, with the emergency plan, follow the activities that are specified in 0654. The emergency plan is lined out exactly to help aid the staff's review with those activities specified in NUREG-0654.

MEMBER BROWN: You actually used the word "engineering decisions" when you just answered the Chairman's question. I mean engineering, is that site engineering; that's outside the plant, or is it, say, engineering inside the plant relative to the operators?

CHAIRMAN RAY: I am sure we're talking about plant engineers.

MEMBER BROWN: Yes, well --

MR. WILLIAMSON: That is correct, plant support, what we refer to as plant support engineering. Again, those are the positions in NUREG-0654, electrical, mechanical, I&C, and nuclear engineering, that would provide oversight and review of some of the activities going on inside the control room to aid the control room staff.

CHAIRMAN RAY: Yes, the word “oversight” is not a good word, either, to be honest with you.

Well, I’m trying to learn here, not provide direction. But I’m just blown away by the words you have chosen to use here. That reference to 0654, of course, is quite definitive, clear, and I don’t see how anybody can be confused about that. But I do get confused when I see what you have said here. It is resulting not in just my uncertainty, which is not of great importance, but it does pertain, then, to, if this is the way you are going to do it, what are the implications for the quality of the data that the TSC has?

MR. WILLIAMSON: Yes, and we understand your concern. We will reexamine the wording that we use in the emergency plan for these command-and-control aspects.

CHAIRMAN RAY: All right. Well, and just to save everybody time and effort -- and we’ll talk to the staff about this shortly -- but if there’s anything you want during the course of this meeting to say specifically further after you reflect on it, we will be glad to give you time to do that.

Are there other questions for the

applicant?

MEMBER ARMIJO: I just want to make a point. It is my understanding that slide 16 represents emergency response independent of whether a new plant would be built onsite. This is what you do right now for one unit?

MR. BONNETTE: That's correct.

MEMBER ARMIJO: Okay. So, they must have an understanding of how they avoid confusion of who's really in charge. That's my concern.

CHAIRMAN RAY: I would say I hope they do, Sam. They surely believe they do.

MEMBER ARMIJO: Yes.

CHAIRMAN RAY: And I think we have heard about that. It's just that I have been through enough of these things to know that, unless you are really clear, there can be confusion when the event actually occurs --

MEMBER ARMIJO: Sure.

CHAIRMAN RAY: -- as to who the heck is in charge of making a recommendation.

MEMBER ARMIJO: Yes.

CHAIRMAN RAY: And the control room can sit there waiting for the TSC to tell them what to do or the TSC can sit there and wait for the control room to ask them whatever questions they want to ask, and those are two ends of a spectrum.

MEMBER ARMIJO: Particularly if the Plant Manager is at the TSC, you know, who's really the boss?

CHAIRMAN RAY: Well, the Plant Manager isn't necessarily someone who's licensed and authorized to operate the plant. He may be, may not be.

MEMBER ARMIJO: It could be.

CHAIRMAN RAY: And so, again, I don't want to get off into more than we should at this point in time, but it is clearly an area that I thought was clear, but it's not so clear, I guess.

(Laughter.)

Dennis tells me that there are other places he has been that it is not so clear.

And so, like I say, the reference to 0654, I understand that totally, and I've inspected against that, and I thought I understood what it said, but now I'm not so sure.

Okay. Any other questions?

(No response.)

What we're going to do now is, because of the 11 o'clock pause that I referred to at the beginning, that the President has asked we all engage in, which I assume will be orchestrated over the PA system, we will take a 20-minute break now before hearing from the staff on emergency planning, rather than to get in the middle of things and be watching the clock, and so on and so forth.

So, as soon as the pause -- I forgot the words now --

MEMBER ARMIJO: Moment of silence.

CHAIRMAN RAY: -- the moment of silence is officially over, we will resume with the staff's discussion of emergency planning.

(Whereupon, the foregoing matter went off the record at 10:38 a.m. and went back on the record at 11:06 a.m.)

CHAIRMAN RAY: All right, I'll pound this again and we'll resume with the staff.

MR. WRIGHT: Good morning.

My name is Ned Wright. I am the Emergency Preparedness Specialist who conducted the EP review of the VC Summer COL application.

I have performed the review of the entire emergency plan and have found it to be acceptable as submitted in the SER. Today we will focus primarily on two issues, that being the EPZ size and the location of the Technical Support Center.

The review that we conducted was in

accordance with NUREG-0800, the standard review plan.

Next slide, please.

The issue with the EPZ, it was mentioned earlier that they are proposing the EPZ as it was used for Unit 1. An issue came up from FEMA addressing the size of the EPZ because Unit 2 and 3 is about three-quarters of a mile away from Unit 1. And their question was, should the EPZ be expanded commensurate with three-quarters of a mile?

By review not only by the applicant, but the State of Carolina and the four risk counties, as well as the FEMA staff, we have concluded that the EPZ as proposed is acceptable. The area of concern was found to be basically a tree farm area. They're into logging with very minimal residential facilities in that area. If you need, we do have a map. We can show you what we found.

As part of the acceptability, we found, as was shown, that the EPZ is approximately 10 miles in radius. The local emergency response needs and capabilities are addressed, and that was an area that we really focused on, and the conditions such as demography, land characteristics, access routes, and jurisdictional boundaries were considered when they established this.

And as was mentioned in the applicant's briefing, the State and the four risk counties have approved the plan and they did sign off respective resolutions saying that.

The next issue is the consolidated TSC for all three units. The applicant followed the guidance in 0696, and as was talked about in the earlier discussion, the control room is in control of the operations of the reactor and the TSC manages the resources to support the control room.

An issue that we had --

CHAIRMAN RAY: That sounds really good to me.

MR. WRIGHT: Thank you, sir.

CHAIRMAN RAY: Manages the resources to support the control room. That's so different than the words I read out of their slide that it's like night and day to me. Okay.

MR. WRIGHT: And again, that is following the guidance in 0696.

In addition, 0696 established a two-minute transit time between the control room and the TSC under the auspices that the TSC was within the same protected area. And in this format, the applicant proposed the TSC to be outside of the respective two protected areas.

But, also, NUREG-0800 allows for reliable communications to compensate for the two-minute transit time. The applicant has projected that, from any of the three control rooms, it will be approximately 10 to 15 minutes going through their security process.

We have reviewed --

CHAIRMAN RAY: Excuse me, Ned. Did you say two-minute transit time?

MR. WRIGHT: No, sir. The original design was a two-minute transit time.

CHAIRMAN RAY: Yes.

MR. WRIGHT: And now what we're looking at is, because of the proposal that the applicant has put forward, that is outside of the protected area. So, we're looking at now, as they have mentioned in their presentation, it will be in the nuclear operations facility where a lot of the technical staff. You will not have to go in and out of protected areas. As an example, if it was in where it is concurrently located in the protected area of Unit 1, a Unit 2 person would have to go out of theirs, into theirs. Well, they've now resolved that by putting it in between them.

CHAIRMAN RAY: Yes. So, you've got to go

into either one of them, whichever it is.

MR. WRIGHT: Yes, sir.

CHAIRMAN RAY: All right. And that's acceptable.

MR. WRIGHT: Yes, sir.

CHAIRMAN RAY: Okay.

MR. WRIGHT: And we've also reviewed and they have provided five communications links with diverse and backup power supplies as well as their data display. So, we're looking at that. It provides that additional communications and data display, that the original design of 0696 was looking at the face-to-face communications.

MEMBER BROWN: When you say communications, links between what and what?

MR. WRIGHT: The communications links are between the facility as well as the TSC and the EOF.

MEMBER BROWN: Main control room to TSC?

MR. WRIGHT: Yes, sir.

MEMBER BROWN: You use the word "diverse".

MR. WRIGHT: What we are looking at it --

MEMBER BROWN: You then use the word "independent" which would be consistent with the comments we got earlier. I'm just trying to make sure I understand. You are talking about diversity --

MR. WRIGHT: Right.

MEMBER BROWN: -- about the power supplies, but only power supplies don't necessarily cover that. I just want to make sure I understood what you were talking about.

MR. WRIGHT: Right. We have a supplemental slide that shows that they have proposed five different communications links, separate communications links, as well as their data links. So, you've got voice communication on one side; you've got data communications on the separate side.

MEMBER BROWN: Go ahead. I'll wait.

MR. WRIGHT: Also, they had proposed EP-ITAACs to validate the capability of the TSC. Those are similar to the ones that you have already been seeing with the Vogtle application.

Next slide.

This is the EPZ, similar to the same picture you saw earlier. The area in this area here is the area of concern.

Next slide.

This is the EPZ edge as it currently is. The area of concern that we were looking at, if you're looking -- this is the plant site right here. This would have been, when you're moving about three-quarters of a mile from Unit 2, then this would basically be adding that part.

We have reviewed this area here. I have personally driven it three times and looked at the area, and from an emergency management perspective, it didn't improve the plan to move the EPZ edge out that far. So, that was the reason that we, working with the applicant, primarily, and the State and the risk counties as well as FEMA, have concluded that that EPZ edge, as it currently is, is acceptable.

MEMBER ARMIJO: So, there's no population in that area of any significance or there's no areas of concern?

MR. WRIGHT: No, sir. I don't have an exact number, but I drove all those roads. There's one or two residents throughout there. Most of the land is owned or managed by either Weyerhaeuser or Georgia Pacific, managed tree farms.

When we looked at the satellite photo, one of the things we found out, you know, all the trees are right-dressed. God doesn't plant trees in that order. So, we knew that this is a managed facility.

And on the other hand, I got run off the road twice by a Weyerhaeuser truck. So, there's a lot of logging going on in that area.

(Laughter.)

And, then, our last slide that we have just outlines some of the communications that they have provided.

MEMBER BROWN: Let me, since several, one, two, three, four, five of these, actually, all of them, no, five, four of them only, a lot of the phone links, are these dedicated-to-the-site-type phone links or are these commercial provided like in this area it would be Verizon or whoever the local phone company is, and they run their entire system? I mean you can do your entire phone right now via Cox, the cable people, or you can go to Verizon, and it's all computer-type stuff. It's not the old land line. I know that only because my daughter and son-in-law lose their phones all the time, and they have to come to my house to use my land line.

(Laughter.)

Of course, they don't think that's a problem, but that's a different issue.

So, that's why I'm asking the question relative to these phone links. Are they the new, modern phone links where you can have every whiz-bang thing or are they the land line, the old-style land line-type phone links?

MR. WRIGHT: I think probably the applicant could answer that better.

MR. BONNETTE: I don't have the answer to that. I can look.

Bob, do you know?

MR. WILLIAMSON: SCANA manages their own phone system. We have two independent phone trunks that run to the site on two independent fiber networks. So, they are independent of each other. We have the potential of having two separate independent phone systems.

MEMBER BROWN: But the substations are the standard phone company substations?

MR. WILLIAMSON: They are not. They are not.

MEMBER BROWN: They are your own?

MR. WILLIAMSON: We have our own fiber running to the station, and they are handled by SCANA fiber.

MEMBER BROWN: It's not the fiber; it's what they go into. The fiber is just -- whose computer control all the communications, the phone company's or yours?

I'm not sure I'm asking this correct. I'm trying to get the point across, when you talk about a diverse system, it's how that diverse system is actuated. The fiber itself does not give you a diverse system. It does not itself give you an independent system. It does provide some better reliability or digital communications, but it's not necessarily independent or diverse. Now two different links makes it different, independent, if they are truly not connected to the same substation supplier, yes.

MR. WILLIAMSON: Well, for example, the two phone trunks we have, both in area code 803, but we have a 345, which is a Chapin, if you're familiar with the area there, Chapin is a town about 15 miles away, and then there's a 931. So, they are physically separated as far as AT&T is concerned.

One thing that's not mentioned up on there as well is we also have an additional phone system that's run by AT&T that is completely separate. It's a ring-down system that runs in the emergency facilities as well as the emergency facilities in the State and county facilities. So, that truly is an independent, separate from the SCANA fiber as well.

MEMBER BROWN: Okay. Let me think about that. Thank you.

CHAIRMAN RAY: Okay.

MR. MINARIK: Dr. Ray, this is Anthony Minarik, and I should have introduced this at the beginning of the presentation. But this is one of those presentations where we're going to start, the staff is starting to sort of combine chapters that are related. And in this instance, the site-specific information for Chapter 18 is very related to what was just going on in the emergency planning. So, I'm going to turn it over to Paul Pieringer, the technical reviewer for Chapter 18, and he's going to get into that discussion, which was essentially already made by Ned.

CHAIRMAN RAY: All right. Paul, we did talk about human factors with regard to multiple, diverse unit TSCs once before. So, take that into account, then, right?

MR. PIERINGER: Okay. Right now, all of the human performance design is following the Vogtle RCOLA submittal with the exception of these two items, which deal with the location of the Tech Support Center and the EOF and the Operational Support Center.

The location was in the DCD COL action items. So, we addressed it within Chapter 18, but we found that the location for the emergency operating facility and the Technical Support Center to be independent of the human performance design.

I'll say the human factors design for the Operational Support Center isn't addressed in regulation, nor is it addressed in any regulatory guidance. So, the applicant is free to do what they want there.

The rest of that human performance was presented about a week ago with respect to Vogtle. I don't know if the current plan was just to present what I just finished.

CHAIRMAN RAY: Yes. I mean I think that the discussion that we had previously was along the lines of whether the displays, which I think of as the main human factors issues, were going to be completely separate for the different units or were going to be common, and simply would identify which unit was being displayed or how that was going to work.

And I think this was a discussion we had a lot longer than a week ago, but the issue was, did we know how that was going to work? And my recollection is, at the time, that we did not. Is that correct?

MR. PIERINGER: That's correct. And we don't have that specificity, but we did introduce a new ITAAC in the emergency planning area that says that during the exercise the applicant has to demonstrate that they can distinguish between units.

CHAIRMAN RAY: Okay. Well, that would allow, in principle at least, to have a single set of displays that were used by the different units involved. And maybe that's the right answer. I don't know. I'm not trying to judge what is a better answer than the other. But at least that's where we are now, is it has to be clearly discernible that I am not looking at the unit which isn't having the emergency and making decisions about it based on incorrect identification.

Okay. Anything else for --

MR. PIERINGER: No, sir, unless we have any other questions.

CHAIRMAN RAY: Okay. Thank you very much.

Okay. We continue to run about a half-hour behind, which is okay. That's not a problem. And I have given everybody an alert about we're going to pause and have a little dialog with Vogtle at some point in time.

MR. CUMMINS: We set it up for noon.

CHAIRMAN RAY: Noon, is it?

MR. CUMMINS: They're going to call in.

CHAIRMAN RAY: Okay. Thanks, Ed.

So, at 12 o'clock, we will have that

discussion. I ask any of you who want to make input to Vogtle for feedback tomorrow to be here for that.

MEMBER BANERJEE: Is Vogtle going to be here tomorrow?

CHAIRMAN RAY: Amy is going to call in. She is traveling here today, will be here tomorrow.

MEMBER BANERJEE: Oh, they'll be here tomorrow?

CHAIRMAN RAY: Yes. Well, we have my brother Ray here is here today, but aside from that, she's calling in at noon. That's why we fixed a time-certain, so they can make whatever assignments they want to make.

MEMBER BROWN: Well, if we finish tomorrow's today, what happens to tomorrow?

CHAIRMAN RAY: We will still come and listen to Vogtle because we have got to write a letter.

MEMBER BROWN: All right. Well, that's fine.

CHAIRMAN RAY: And we certainly want to get the answers.

MEMBER BROWN: I just didn't see it on the --

CHAIRMAN RAY: Yes, it's not on there.

That's why I keep reiterating it.

MEMBER BROWN: Thank you.

MEMBER BANERJEE: Harold, with regard to Summer, we are supposed to write a letter at the Committee meeting?

CHAIRMAN RAY: Yes, I'm not going to be able to fit in Vogtle with Summer with AIA. Jack's got a letter, and I don't know who else does.

MEMBER BANERJEE: Are we able to revisit this external hazards analysis for Vogtle?

CHAIRMAN RAY: Well, as I said --

MEMBER BANERJEE: I mean not for Vogtle, for --

CHAIRMAN RAY: For Summer?

MEMBER BANERJEE: Yes.

CHAIRMAN RAY: When you say "revisit" it --

MEMBER BANERJEE: That was an open item that was left.

MR. SEBROSKY: That is the subject of the next presentation.

CHAIRMAN RAY: Yes, we are going to try to visit it now. Whether we can revisit or not will depend on how this visit goes.

(Laughter.)

MEMBER BANERJEE: Oh, all right. This is

the visit I was talking about.

(Laughter.)

CHAIRMAN RAY: Okay.

MEMBER BANERJEE: It's happening.

MS. MONROE: We're here.

MEMBER BANERJEE: All right.

CHAIRMAN RAY: Amy, proceed.

MEMBER BROWN: Do we have this presentation?

CHAIRMAN RAY: We have to ask Weidong. Do we have this presentation, the handouts?

MR. WANG: Yes, you do. Both are from NRC.

MR. SEBROSKY: No, Weidong, this is Vogtle's, I mean Summer's.

MS. MONROE: Is that in the package that's sitting in front of you?

MEMBER BANERJEE: Action Item 63? We don't have it. No wonder I didn't know what this was about.

CHAIRMAN RAY: I don't know why we seem to be more disjointed today than usual, but it must be my fault. Is it coming?

MR. WANG: Yes, it's coming.

CHAIRMAN RAY: All right. It is coming. Why don't you go ahead, and Weidong will pass it out.

We will try to pay attention.

MS. MONROE: Okay. My name is Amy Monroe, and I brought Dan Patton, and Mary Richmond will help to address some of the questions that you had in the previous July presentation.

We presented, at the request of you, provided some calculations on hazards due to the offsite chemicals. The hazard scenarios were evaluated for each of the accidents identified in Reg Guide 1.206, including hazards from explosive, flammable vapor clouds or delayed ignition and toxic chemicals from nearby transportation and industrial facilities, including Unit 1 and rail-borne chemicals transported on Norfolk Southern line that run along the Broad River.

The analysis showed that the effects of the explosions of flammable vapor clouds would not pose a threat to any of the safety-related systems, structures, or components. And the analysis showed that the toxic vapor clouds would not exceed toxicity limits in the control room and would not pose a threat to control room operators.

MEMBER BANERJEE: Can I ask you a question there?

MS. MONROE: You certainly may.

MEMBER BANERJEE: Okay. This was the work that Bechtel did, right? They used this ALOHA code that they have.

For the toxicity, for chlorodifluoromethane, they estimated distance of 9504 feet, and the control room is 4200 feet. So, I mean, I suppose that some calculations were done which showed that the maximum concentration in the control room was 931 ppm in your Table 3, which is getting pretty close to the limit of 1250 ppm.

So, could you sort of -- there is no derivation. I have no idea how this is done, how you arrive at these numbers, or Bechtel does. So, we would be very interested to know how you arrive at them.

The outdoor air exchange rate is .95. There are no units. The whole thing is a mystery.

MR. PATTON: This is Dan Patton from Bechtel.

The .95 is number of air exchanges per hour.

MEMBER BANERJEE: Okay. You assume that? This was shown in Part 2.

MR. PATTON: The ALOHA computer program has the capability to model an indoor concentration.

We modeled the number of air exchanges, the .95, and it will calculate as a function of time the indoor exchange rate.

MEMBER BANERJEE: So, here's probably what we should do because it's obscure what you have done. I'm going to give you a written thing from us, which I think would be good to -- you know, we can't go into the details here that we need to. So, we would like to see some response to that because we don't understand a lot of stuff in there.

CHAIRMAN RAY: This will be done informally, and hopefully --

MEMBER BANERJEE: Anyway you would like, yes.

(Laughter.)

CHAIRMAN RAY: Yes. Hopefully, it will be like just a verbal request to get some response. Hopefully, you will be able to handle it shortly. Okay?

MEMBER BANERJEE: Yes. There's just too much detail to get here. We need to have more information.

Wasn't this circulated to them before, after July?

MR. WANG: Or later, I guess, yes.

MEMBER BANERJEE: Because this, you know, it doesn't address any of the issues that we have here. It just says analysis shows that it does not exceed. Great, but we would like to know how the analysis shows, you know.

MS. MONROE: So, you have something that provides some specific questions?

MEMBER BANERJEE: Yes, yes. We wrote this down at the end of the last meeting.

MS. MONROE: Okay. We just received that this morning. So, we'll look at it and try to provide you some feedback.

MEMBER BANERJEE: Oh, okay. You have received that?

MS. MONROE: Yes.

MEMBER BANERJEE: Great.

MS. MONROE: Just this morning. So, we will look at that and provide you with some responses.

MEMBER BANERJEE: Yes. There are also some mysteries with regard to the flammable cloud stuff. I don't know if you received anything there. I'll make sure that you get the material. We will give it to you as well.

MS. MONROE: Okay.

CHAIRMAN RAY: Sanjoy, is it possible for us to do that by the end of the lunch break, that is, before we resume this afternoon? I just want to give them as much time as we can.

MEMBER BANERJEE: Yes, we can probably do something.

CHAIRMAN RAY: Okay.

MEMBER BANERJEE: But part of the problem is that they are using codes which we have not seen. We have done any due diligence on them, never looked at them. So, sure, ALOHA might be accepted, but we don't know what's in there.

CHAIRMAN RAY: Are there similar questions we will have for the staff on this subject or would have?

MR. SEBROSKY: Staff is prepared to make a presentation on the confirmatory analysis that it did. And in one case, it used ALOHA.

MEMBER BANERJEE: That would be helpful.

MR. SEBROSKY: We our staff at the front to do that.

CHAIRMAN RAY: Good. Is that scheduled right now?

MR. SEBROSKY: Yes. Coming up right after --

MEMBER BANERJEE: Maybe what we should do is hold this until we hear the -- if the staff has done confirmatory calculations with the independent code and shown that the results are reasonable, that would set a lot of these questions to rest, I think.

CHAIRMAN RAY: Okay. All right. Is that, then, all you plan to say on this subject now?

MS. MONROE: Yes, sir.

CHAIRMAN RAY: Okay. Now do we move over to the staff now or are we going to proceed with other issues that you're responding to?

MR. SEBROSKY: The presentations, there's two action items that the staff had. One action item relates to the confirmatory calculations that the staff did for toxic gas. We have a presentation for that.

CHAIRMAN RAY: All right.

MR. SEBROSKY: That's what is intended to immediately follow. And, then, after that, we had a question on Section 2.5, and we have the staff members to provide the response to that action item.

CHAIRMAN RAY: Bill, is that your item that he is referring to, then?

DR. HINZE: Right.

CHAIRMAN RAY: Okay. All right. Then, we'll proceed in that fashion. We will hear from the staff on the subject just discussed by the applicant, and then we'll proceed to another topic which is encompassed in some input we received from Dr. Hinze following the July meeting.

MEMBER BANERJEE: There's just other point, which is the calculation of the vapor cloud explosions. We looked at this, and how they arrive at for, let's say, the liquids, which are volatile, how they arrive at the gas fraction is not entirely clear. For the liquefied gases, though it's not stated, we assume that it was all take as gas.

MR. SEBROSKY: That's correct.

MEMBER BANERJEE: Right? And the number of liquefied gases that you consider in the analysis was, we only found one, but there was another one somewhere in the discussion that came up that they were identified as a second liquefied gas which was being transported. I can probably find it in my notes somewhere, but I thought there were two liquefied gases that were being transported.

MR. SEBROSKY: Mary?

MS. RICHMOND: Yes. Mary Richmond, Bechtel.

There are two liquefied gases. The second one has no flammable limits. It's not explosive. So, we didn't consider that in the explosive analysis.

MEMBER BANERJEE: What is the second gas?

MS. RICHMOND: Chlorodifluoromethane.

MEMBER BANERJEE: And the one that combusted was what?

MS. RICHMOND: Difluoromethane.

MEMBER BANERJEE: Okay. And these are the only two liquefied? Is it in this list of 25? Or are there things beyond that list that have to be considered?

MS. RICHMOND: We looked at the list of 25. There were two years we looked at. We looked at 2006, and, then, we got the second set of data points from Norfolk Southern to make sure we included everything. That was a little bit closer.

So, we looked at each, every one of those and did a screening analysis on those. And the ones that had a flammability limit or a toxicity limit, we looked at that and we evaluated all of those. And, then, we went even a step further and said, well, perhaps there will be some things going up and down the line, and did a frequency analysis to see if that was possible. So, we've looked at every one that we've gotten from Norfolk Southern, every chemical.

MEMBER BANERJEE: So, you think that there is no chance of -- the liquefied gases you identified were very low flammability?

MS. RICHMOND: Right.

MEMBER BANERJEE: But there are, of course, many liquefied gases which are very high flammability. So, there is no chance that there will be any other liquefied gases transported?

MS. RICHMOND: I can't say that there's no chance. There could be a different one.

MEMBER BANERJEE: Yes.

MS. RICHMOND: And that's why we did the frequency analysis, because of that very point. I mean there could be propane. I think you're probably considering that.

MEMBER BANERJEE: Right.

MS. RICHMOND: And there could be some other things, but that's precisely why we did the frequency analysis. As of now, and you can't predict what's going to happen in the future, the applicant has done every chemical that they are aware of that's going up and down the rail line that's transported with any frequency.

MEMBER BANERJEE: So, you don't think that there would be any liquefied petroleum gases going through of any sort, propane --

MS. RICHMOND: Right now, there haven't been any that have been identified.

MEMBER BANERJEE: Is there any control over this, whether they can be or cannot be?

MS. RICHMOND: No.

MEMBER BANERJEE: Nothing?

MS. RICHMOND: There's no control.

MEMBER BANERJEE: What happens if it was propane? Did you do any analysis of that?

MS. RICHMOND: What we did do is look at Reg Guide 1.91 for a railcar explosion, and the applicant has 4200 feet from the distance to the rail. An explosion for the screening of Reg Guide 1.91 is a little under 3,000 feet. So, we think any kind of explosion from a railcar accident would be within the bounds.

MEMBER BANERJEE: The issue here, of course, as you well know, is that any heavy liquefied gas would spread as a dense gas, and it will stay low to the ground. And we've had many, many accidents of this nature where the vapor cloud has ignited long after, and it has moved without dispersion down topography. Is there any such topography that could take a dense gas cloud near the plant?

MS. RICHMOND: Actually, the way the

topography is for this site, the dense clouds will move away from it because the site actually sits 150 feet higher in elevation than the rail with a couple of hills between. So, most likely, the dense gases will travel parallel to the hillside and move away from the site. It would be very hard for that dense gas to move off over the hills towards the control. So, actually, the way the topography is would help in this case.

MEMBER BANERJEE: Okay. So, even if you had propane, it would not get there?

MS. RICHMOND: Right. It would be very difficult for it to get there. There would be a lot of dispersion between you need unstable meteorological conditions to really move that up over the hills. And, then, you've got the eddies created by the hills, which is going to give you even more dispersion. So, if it were to make it, it would be in such low quantities. You really need really strong unstable conditions.

MEMBER BANERJEE: And an explosion off the railcar of something like propane would not give you this one psi rise?

MS. RICHMOND: It would not at a distance of 4200 feet that they have.

MEMBER BANERJEE: For propane?

MS. RICHMOND: For propane.

MEMBER BANERJEE: Did you calculate that?

MS. RICHMOND: That, we would use the screening criteria in 1.91.

MEMBER BANERJEE: Which was what?

MS. RICHMOND: If you have a railcar, just under 3,000 feet will give you the 1 psi for the TNT equivalent. That's using the TNT equivalents, not that it --

MEMBER BANERJEE: For propane or for the diflouro --

MS. RICHMOND: For hydrocarbons. For any hydrocarbon.

MEMBER BANERJEE: Oh, any hydrocarbon?

MS. RICHMOND: Right, right.

MEMBER BANERJEE: Okay. All right.

MEMBER BROWN: The rail line, is that the one along the Parr Reservoir?

MS. RICHMOND: It's along the Broad River.

MEMBER BROWN: I'm looking at this picture. It's the one on the left of that?

MR. PATTON: Yes.

MEMBER BROWN: And when you talk about 4200 feet, is that the closest approach to the plant area that is shown for Unit 1 and Unit 2?

MS. RICHMOND: Yes, it is.

MEMBER BROWN: So, the distance to the switchyard is much closer? It looks like it would be like, I don't know, a thousand feet, 500 feet.

MS. RICHMOND: The switchyard to the plant --

MEMBER BROWN: So, something could blow out the entire switchyard, if it went there, is that correct?

MR. PATTON: We calculated the distance to the nearest safety-related system structure or component. So that's the 4200 feet.

MEMBER BROWN: Okay. No, I just wondered how that was considered. That's why I asked the question. So, that's outside of the boundary that we would look at that from that standpoint. Okay. Thank you.

MEMBER BANERJEE: Okay. Now we can go on to toxicity.

CHAIRMAN RAY: Thank you. I believe, if I'm not confused, we're at the staff comments now.

MR. HABIB: My name is Don Habib.

For the staff presentation, it is broken down into two parts. The first part will be by David

Sisk from the Siting and Accident Consequences Branch, and the second part will be by Shie-Jeng Peng from the Containment and Ventilation Branch. Mr. Sisk covers the one for Chapter 2 and the control room habitability is by Mr. Peng.

MR. SISK: Sorry. I had to put my glasses on.

Yes, I evaluated the chemicals that were transported on rail onsite and nearby facilities and concurred with the results of their compilations that there were no problems with explosions. I mean a 1 psi wave would not reach the near safety-related equipment.

On the toxic gases, I determined that there were three potential -- I mean they were still toxic when they reached the area of the intake to the control room. As soon as I determined that, I turned that over to Mr. Peng, who handles Section 6.4 of the SCR, and he does a further evaluation on that.

For my toxic chemicals, I used ALOHA, and for my explosions, I used the Reg Guide 1.91, the formula for solids. And for liquids and gases, I also used ALOHA.

MEMBER BANERJEE: Did you do any independent checks?

MR. SISK: Yes.

MEMBER BANERJEE: ALOHA is their code, right? Did you use any other code?

MR. SISK: I used ALOHA, but I did it independently, my own inputs with what was available. And, then, the ones that I determined to be toxic in the area of the intake, those were reperformed by Mr. Peng, and he uses HABIT.

MEMBER BANERJEE: But that's the mixing into the control room, right?

MR. SISK: Right.

MEMBER BANERJEE: So, the dispersion to the control room was also done with ALOHA, right, as well as, I suppose, mixing inside the control room?

MR. SISK: Well, let me ask Mr. Peng. Did you take the toxic gases from the intake into the control using HABIT or did you use HABIT all the way from the railroad?

MR. PENG: I used HABIT from chemical released to the control room, inside the control room.

MR. SISK: Oh, okay.

MEMBER BANERJEE: So, you did the whole thing?

MR. PENG: I did the whole thing.

MEMBER BANERJEE: Okay.

MEMBER REMPE: Now you used ALOHA or ALOHA 2007? Because you guys were using ALOHA 2007? And what's the difference? It's a Bechtel proprietary versus EPA?

MS. RICHMOND: No. Actually, ALOHA, the code that we use is the EPA/NOAA code. That's the code we use.

What we do is we run a verification program on it, and it's one of our standard computer programs because we have done the validation behind it. But, yes, the ALOHA that is from the EPA and NOAA.

MEMBER REMPE: Okay. I thought in some of the documentation I would see like ALOHA 2007 in some of the reports that were sent to us?

MR. PATTON: That's just a reference citation.

MEMBER REMPE: Okay.

MR. PATTON: So, it is the ALOHA program, the same as --

MEMBER REMPE: It's the EPA one? It's not the --

MR. PATTON: Yes.

MEMBER REMPE: -- Bechtel variation of it?

MR. PATTON: That's correct.

MEMBER REMPE: Okay.

MEMBER BANERJEE: But does ALOHA move to DEGADIS for heavy gas?

MS. RICHMOND: Yes, it does.

MEMBER BANERJEE: Okay.

MEMBER BROWN: You said you used the version of the code where you have validated it. You used the word “validated”. Did you actually run experiments or did somebody run experiments for you? That’s what I view as a validation, where somebody does something to make sure the results of the code actually are consistent with actual --

MS. RICHMOND: Right. We had a validation, a verification process. And we run different sample problems in line with what the EPA has done to make sure that we are getting the same answers.

MEMBER BROWN: So, they are problems, not --

MS. RICHMOND: Right.

MEMBER BROWN: -- not explicit experiments?

MS. RICHMOND: In the case of this software, yes.

MEMBER BANERJEE: There are experiments.

I didn't know what they do, but there are a lot of heavy gas dispersion experiments.

MEMBER BROWN: Well, isn't that a matter, though, that they use those experimental results to validate -- is that the question you're asking?

MEMBER BANERJEE: No. I was simply trying to figure out what ALOHA is. I suppose that it has an option which is something like just a dispersion option other than for heavy gas when it uses something like DEGADIS, which was done back in the -- it's not a CFD program. This was done back in the seventies by Shell. It came out of HEGADIS, which is another -- so, there's all sorts of issues with this, but we have sort of blessed it right now. I don't know if we have blessed it, the NRC, but EPA uses it. So, that's about where we are.

This is a very, very toxic subject still.

(Laughter.)

MEMBER BROWN: No pun intended.

CHAIRMAN RAY: Okay. Let's see, are we ready to move to the presenters here now?

MR. SISK: The three chemicals that we determined needed to be further reviewed in Section 6.4 by the control room and ventilation people were the 28 percent ammonium hydroxide, the cyclohexylamine, and the chlorodifluoromethane, right. Right, those were the three chemicals, and those were for toxic calculations.

Of course, I also did explosion calculations on those, but they weren't even close. Those were the only three that required further attention.

The maximum probable solid boxcar cargo is 132,000 pounds, which is spelled out in Reg Guide 1.91. The TNT equivalence of 1 was used for non-military explosives. That's also provided in the guidance of Reg Guide 1.91.

One boxcar is evaluated because the pressure waves from the subsequent explosions are not cumulative. There was some questions you all raised about why we used one boxcar. There is some guidance in Reg. Guide 1.78 that says that analysis is -- the largest container or source is, let's see, let me read this. This is from Reg. Guide 1.78, page 7:

It says, "For maximum concentration accident involving hazardous chemicals, the instantaneous release of the total contents of one of the following should be considered in the analysis. The largest storage container within the guidelines that is located at a nearby stationary facility or the largest shipping container within the guidelines that frequently is transported near the site or multiple containers of equal size, providing the failure of one container could result in the failure of subsequent containers, or the largest container stored onsite normally, the total release from this container unless the container is interconnected in such a system that the failure of one will result in the failure of all of them."

So, basically, what Reg. Guide 1.78 is saying is you analyze the largest container and perform your analysis on that.

MEMBER BLEY: Well, it doesn't sound that way to me. It sounds like it is saying, if the mechanism that could release one could release more than one, you ought to look at more than one. And train accidents don't usually just involve one car.

MR. SISK: For explosives --

MR. BROWN: Dave, can I interrupt you for a moment?

My name is David Brown. I am the Branch Chief for the Siting and Accident Consequences Branch.

What David is describing is guidance that pertains to toxic chemical releases. The issue here is whether it would be credible for more than one boxcar containing explosives to simultaneously explode.

It is our view that it is reasonable in this case that we don't have those sorts of substances normally transported on this rail. Certainly it's possible that one boxcar could explode and lead to subsequent explosions, but we would still have only one pressure pulse at a time.

MR. SISK: The substances, certain exotic substances, could explode and cause simultaneous explosions in more than one boxcar, but that would be something like nitroglycerin or certain primers, like we used to use mercury, fulminate of mercury, and they've got some replacements for it now.

But these type of materials, if one boxcar exploded, then the pressure wave from it would reach the two adjacent to it at approximately the same time and cause a near simultaneous explosion. But, then, as the wave traveled further away, the other subsequent explosions would be somewhat later than that. And so, the effect of the wave would not be cumulative. You would get perhaps, if you were traveling, I mean having these particular exotic explosions, you could get two boxcars or more, but not much.

MR. BROWN: David, can I interrupt you again?

Did you have any further questions on that point?

MEMBER BLEY: No, I'm just sitting here thinking about it a little. I mean the idea of 100 percent instantaneous is a bit of a conservatism if it's a car going off because of the internal thing.

MR. SISK: Right.

MEMBER BLEY: Then, I can see your argument. What if it's a train crash? I don't know if there are sitings along here. The switches get out of position sometimes, and we have had some pretty big crashes that involve up to seven or eight cars all being ruptured.

MR. SISK: Still, you should not have -- I mean some of them could be ruptured, but I mean they wouldn't be rupturing and exploding at the same time. There would be a certain --

MEMBER BLEY: I think that is the key for it, yes.

MR. SISK: Right. There's a certain finite time between the two. So, for the blast, you would have a pressure wave and, then, another pressure wave. So, they would not be cumulative.

MEMBER BANERJEE: Now I guess the issue really is, if you have a liquefied gas and you have several cars that are affected, so the liquefied gas then forms a vapor cloud from several cars. And now the cloud between the LFL and the UFL explodes. It doesn't have to be from one car. That's the issue I think he's coming up with. You could get rupture of several -- you know that ignition doesn't happen instantaneously. Ignition can occur much later.

MR. SISK: That's true.

MEMBER BANERJEE: So, once you have formed the cloud from three or four cars, it could ignite. That's really the issue.

MR. SISK: That's true. Well, in this one, for this one case only, Summer, we actually did a calculation and determined that, actually, it would take over six boxcars exploding simultaneously to produce a pressure wave that would still be at 1 psi when it reached --

MEMBER BANERJEE: But exploding at the site or the discussion we were having is a heavy gas can move. Now you are saying it moves always away from the site, right? I haven't looked at the topography, but --

MR. SISK: For this location, the heavy

gas would be almost, since the railroad is right next to the river, the river is flowing down and away from the site, if you had a release there, the heavy gas would flow into the river and down the river away from the site.

MEMBER BANERJEE: So, the worst location is a release of several boxcars at the line itself, which then ignites?

MEMBER ARMIJO: Or it doesn't. It doesn't flow away. It just stays in one --

MEMBER BANERJEE: Yes, it stays and then it ignites.

MR. SISK: Oh, yes. That's the one that I just mentioned to you, that if you just ignite a number of boxcars together -- I told you back in July that I did it for three boxcars. But, subsequent to that, I went ahead and looked and determined how many it would take to create a pressure wave of 1 psi at the nearest safety-related building. And that would be a little over six boxcars. Almost six and a half boxcars would have to explode at the exact same time delivering full effect.

MEMBER BANERJEE: Just from one cloud; that's all.

MR. SISK: Oh, I wasn't talking -- I was

talking about solids.

CHAIRMAN RAY: Let me interrupt here. Yes, that's what he's talking about, boxcars. But, remember, Sanjoy, the plant located at the upper reservoir of a pump storage arrangement.

MR. SISK: It's roughly 150 feet above it. And so, if any heavy gas --

CHAIRMAN RAY: It's a big elevation difference with a river course at the lower elevation --

MR. SISK: Right.

CHAIRMAN RAY: -- which is where the railroad is.

MR. SISK: So, any heavy gases would move away.

MEMBER ARMIJO: Is this the topography that creates that large margin? Did the topography really control your conclusion that it takes six boxcars before you would get --

MR. SISK: No, no. The six boxcars of solid material is assuming a flat surface. It's not taking credit --

MEMBER ARMIJO: So, you have that actual --

MR. SISK: The hill is an actual

additional conservative measure.

MEMBER ARMIJO: Okay.

MEMBER BANERJEE: So, we're talking two different things. He's talking about solids now.

MEMBER ARMIJO: Yes, you're talking tankcars rupturing.

MR. SISK: Right. We're talking the tankcars of heavy gas. The hill would divert the flow, and so the heavy gases are not --

MEMBER BANERJEE: Yes, but you could get several tankcars with heavy gas --

MR. SISK: Yes, that's true.

MEMBER BANERJEE: -- rupturing, adding to a cloud. The cloud moves slowly.

MR. SISK: Right.

MEMBER BANERJEE: So, it's not going to move right away. So, it sits there and it ignites.

MR. SISK: Right.

MEMBER BANERJEE: It happened in Mexico City. It has happened a lot of places.

MR. SISK: Right.

CHAIRMAN RAY: I think on that score it's the elevation difference that they're counting on, which is substantial.

MEMBER BANERJEE: But now, if you've got a levy, I mean there are all sorts of things that can happen here.

MR. BROWN: Could I just interrupt for a moment? I'm sorry.

Dave Brown again, Branch Chief of the Siting and Accident Consequences Branch.

When we're talking about explosions, we're talking about generally implementation of Reg. Guide 1.91, for which the guidance states, essentially, one container is the maximum credible amount for an explosion. You know, if we're talking about toxic gas analysis, that that Reg. Guide doesn't apply, we might reasonably consider additional containers. But, even there, Reg. Guide 1.78 says a maximum conservative container consideration is one container.

CHAIRMAN RAY: Well, wait a minute. We can consider other things. Okay?

MR. BROWN: I was just explaining the staff's position and the guidance --

CHAIRMAN RAY: All right. I understand that point, but, nevertheless --

MEMBER BANERJEE: It gives you regulatory certainty that you derail a train and only one of these rupture --

CHAIRMAN RAY: The thing to keep in mind

is you've got a big elevation difference here that favors the plant relative to any heavy gas, irrespective of the Reg. Guide limitation. And the solids, which are by definition remote, have both the elevation difference, like Sam said, and the fact that it's the distance. It's hard to imagine setting off all of this six and a half boxcars simultaneously without a very elaborate detonator.

But, anyway, I think we've --

MEMBER BANERJEE: I think he is talking about solids, and I would agree with what you're saying.

CHAIRMAN RAY: He is talking about solids --

MEMBER BANERJEE: Yes.

CHAIRMAN RAY: -- for that one.

MEMBER BANERJEE: You're not talking about the gases right now.

CHAIRMAN RAY: He's trying to talk about both of them, Sanjoy, is my point.

MEMBER BANERJEE: Well, he hasn't come to the gases yet.

CHAIRMAN RAY: All right.

MR. SISK: Yes. Yes, we did. The heavy gases would not flow normally up the hill. If they did, I mean they would be heavily dissipated. If they collected down in the lower river basin -- there's even a little marsh area there that a lot of heavy gas could collect in -- you would still, I mean even if you had several tanker cars full of the heavy gas collecting down there, the distance -- you could explode several of the heavy --

MEMBER BANERJEE: You know, of course, that heavy gases have gone uphill just due to the wind?

MR. SISK: Yes.

MEMBER BANERJEE: Often.

MR. SISK: Yes.

MEMBER BANERJEE: It's not unknown. So, it happens.

MR. SISK: But, if a heavy wind pushes it up the hill --

MEMBER BANERJEE: It doesn't need a heavy wind. It needs a wind.

MR. SISK: Okay, a wind pushes it up the hill.

MEMBER BANERJEE: You get a little bit more dispersion, but that's okay. If you have six boxcars and you get your cloud --

CHAIRMAN RAY: Can we call them tankcars, just to keep people from being confused?

MEMBER BANERJEE: So, you're going to move a cloud with some dispersion.

MR. SISK: Right.

MEMBER BANERJEE: It could be high dispersion. I haven't sat down and done the calculations. I don't know. So, it's probably not Pascal F weather, but it could be some other cloud case. But the wind could be blowing up the hill, and it can move a cloud up the hill. It happened before in a lot of cases or bad accidents between valleys and all sorts of things. This is a well-worked area, and nasty stuff has happened.

So, I'm not totally convinced that, first, you have to only consider one tankcar. Two, that you cannot get a heavy gas cloud moving up a hill. It will have more dispersion, but that calculation should be done, right, to see how much dispersion there would be?

I'm prepared to believe that it won't happen in F weather or G weather, but it could happen. What is the slope of the hill?

MR. SISK: It's nearly vertical.

MEMBER BANERJEE: It's vertical?

MR. SISK: Yes, nearly.

MEMBER BANERJEE: So, it's like a cliff?

MR. SISK: Yes.

CHAIRMAN RAY: Like I am saying, it's a pump storage facility. By definition, you've got a big head difference.

MEMBER BANERJEE: Well, then, I don't think it will go up.

(Laughter.)

I agree with that. If it's a hill, it will go up.

CHAIRMAN RAY: Yes, but --

MR. SISK: No, it's not a hill. It's a cliff.

MEMBER BANERJEE: Okay. That's reassuring.

Why is this railway line this close? It doesn't look very far from the plant.

CHAIRMAN RAY: It's in the river bottom, which is pretty typical for old rail lines.

MR. SISK: And it is still 4,200 feet away from the power block area.

MEMBER BANERJEE: I know that Harold had a railway line much closer to his plant. That's why he's --

(Laughter.)

CHAIRMAN RAY: But we won't speak about that.

(Laughter.)

MEMBER BANERJEE: All right. Yes, I'm done.

CHAIRMAN RAY: All right. And we'll come back and see if we've got anything for the applicant after we're done with this segment.

We're past 12 o'clock now. Is Vogtle all right to stand by until we're done with this?

MR. CUMMINS: Is somebody on the phone from Vogtle?

MR. WANG: It's on mute.

CHAIRMAN RAY: Okay. Well, listen, I don't want to interrupt these guys. Just ask them if they can stand by until we're done with this.

MEMBER ARMIJO: Just to wrap this up --

MR. SISK: Yes, it should take just a couple of minutes for --

CHAIRMAN RAY: Let him ask him question.

MEMBER ARMIJO: One quick question. The concentration that you calculated for these toxic chemicals --

MR. SISK: Right.

MEMBER ARMIJO: -- was that, again, also

assuming a flat --

MR. SISK: Yes.

MEMBER ARMIJO: So, you didn't take into account the fact you had a cliff?

MR. SISK: No.

MEMBER ARMIJO: And a big elevation difference?

MR. SISK: No.

MEMBER ARMIJO: So, those numbers are probably highly conservative as well?

MR. SISK: They are very conservative.

MEMBER ARMIJO: Okay.

MR. SISK: Also, in our calculation we assume, basically, that, oh, you take the railcar and you zip it open from one end to the other and it all dumps at one time. So, it's a worst-case scenario.

And, then, of course, if you looked at the drawing, you will notice the railroad runs down. So, there's only one boxcar at that shortest distance. The others going both directions would be further and further away. So, yes, that's a little additional conservative. If you had more than one, I mean they would be further away. And the wind blowing one direction, it would not -- there's no funnel or anything that would allow the stuff to float up the hill to the plant. It would be dissipated in different directions.

MEMBER BANERJEE: They had a very nice picture showing the topography.

MEMBER ARMIJO: Yes.

MEMBER BANERJEE: Do you have that? Can you just bring it up or something, so we can take a look at it?

MR. SISK: I don't think we have that.

MR. SEBROSKY: That picture is in the hydrology presentation. If we could, could we just go to Mr. Peng's presentation? He will explain to you what he did as a result. And, then, if we want to have a discussion about topography, maybe we can do that this afternoon. But we also have the 2.5 folks up at the front here. So, there's two -- I think it will take five minutes to go through Mr. Peng's presentation, but if it's impossible, Mr. Ray, I would also like to touch on the 2.5 action item.

CHAIRMAN RAY: Yes. All of a sudden, we've got a convergence of things, but we'll try to get through it. But, yes, Mr. Peng, please proceed.

MR. PENG: First, I used an NRC-sponsored computer code, HABIT. HABIT was developed by Pacific Northwestern Lab. It was done 10 years ago, has been revised once.

This computer code has been included with the test data from 600 measurements from like Idaho Engineering Lab, TMI. So, we have enough data to support data built into the computer code to address all problems of chemicals from release to the control room site. Okay?

I was asked to perform the analysis for these three chemicals, and I considered the site, weather condition from stability A to Z, seven conditions. Also, I took care of the site wind speed from .35 meters per second to 11.5 meter per second. So, for each chemical, I analyzed 70 cases and picked the maximum concentration and put it into this table.

MEMBER REMPE: Out of curiosity, how much of a variation did you see, if this is the maximum? Did it go from 50 percent to 100 percent of what you've got there?

MR. PENG: Yes, it could be 10 times difference.

MEMBER REMPE: Ten times? Okay.

MR. PENG: So, this is my result. Any questions?

MEMBER ARMIJO: These are your maximums calculated from your various conditions that you considered.

MR. PENG: Exactly. For 70 cases for each chemical.

MEMBER ARMIJO: Yes. Now have you done anything like a back-of-the-envelope -- or probably more than a back-of-the-envelope calculation for taking into account the topography? I just want to get a feel for, are these numbers --

MR. PENG: How much conservatism?

MEMBER ARMIJO: Yes.

MR. PENG: Yes.

MEMBER ARMIJO: Ten or 100 times --

MR. PENG: I can share with you, for example, I used the highest temperature, even put into the AP1000-100, 155 degrees, that high of a temperature. In the control room size, I used very small, relative to half of the built-in number. For heavy, you don't have the input air exchange read into the analysis.

MEMBER BANERJEE: What was the concentration like just outside the control room?

MR. PENG: It depends. Sometimes, in some cases, like two times, something like that. But because the ventilation rate between the control room and the outside is small, it's relatively small. So, not necessarily the control room concentration will be the same as the control room intake concentration.

MEMBER BANERJEE: Right, right. But how did your calculations agree or not agree with ALOHA at the outside of the control room?

MR. PENG: HABIT result is relatively smaller than ALOHA results.

MEMBER BANERJEE: Why is that?

MR. PENG: This computer code is different.

MEMBER BANERJEE: Yes.

(Laughter.)

Well, shall we just multiply that uncertainty the other way as well then?

MR. PENG: Well, like I said upfront, I have very confidence with my use of HABIT because HABIT has been created based on tests that they did.

MEMBER BANERJEE: Well, so does ALOHA, I imagine.

MR. PENG: I don't know if ALOHA did it, but I have confidence with my HABIT.

MEMBER BANERJEE: So, HABIT gives you roughly half the concentration of ALOHA?

MR. PENG: I cannot say. That depends on how much and how high and how do you evaporate your chemical. It depends. It depends on the case. In some cases, it is even very close. In some cases, it could be a little bit different.

MEMBER BANERJEE: So, it is the source term?

MR. PENG: Yes, source term.

MEMBER BANERJEE: So, you have a pool that you're evaporating from?

MR. PENG: Yes, I have a pool.

MEMBER BANERJEE: Is that also what ALOHA does?

MR. SISK: Yes.

MEMBER BANERJEE: So, the chemicals are forming a pool and it's evaporating from there? So, then, you take into account a heat transfer model from the air, from the ground evaporation?

MR. PENG: Exactly.

MEMBER BANERJEE: So, it's a complicated calculation, right?

MR. PENG: Yes.

MEMBER BANERJEE: And which experiments is HABIT attuned to?

MR. PENG: We have a couple of reports. You can look at PNL10286.

MEMBER BANERJEE: Right.

MR. PENG: And they have some measurements, like I said before, in the four slides, different places in the whole United States. I believe that data has covered very completely the whole potential sites.

MEMBER BANERJEE: These are mainly volatile chemicals, these experiments? That's separate from the experiments that are done by the chemical industry then?

MR. PENG: I don't know that detail, I'm sorry, about how they performed that testing.

MEMBER BANERJEE: Right. Because I'm wondering why there's this big difference between ALOHA and HABIT. Is it the evaporation rate? Is it the dispersion model? Is it the pool model?

MR. PENG: It could be everywhere.

MEMBER BANERJEE: Yes.

MR. PENG: It even depends on how you perform the analysis. So, I cannot say --

MEMBER BANERJEE: And HABIT has a heavy gas model in it?

MR. PENG: Yes. In fact, they've got 1.7, and it doesn't allow you to take credit of heavy gas.

MEMBER BANERJEE: Oh.

MR. PENG: In my analysis, I assumed it

can flow out --

MEMBER BANERJEE: So, you are not having a heavy gas model in here?

MR. PENG: Yes, I didn't.

MEMBER BANERJEE: Whereas, I imagine ALOHA has a heavy gas model. That could explain a factor of two. But why do you say yours is conservative?

MR. PENG: I didn't say it's conservative. I said my analysis, the best is assumed heavy, but the heavy is not the only reason to have the difference. It could depend on how much or how you assume your release from the pool. It depends on how you assume your weather condition and wind condition. And wind can blow out everything. I don't know.

MEMBER BANERJEE: Yes, but --

MR. PENG: I am not in the position to analyze it, distinguish it, these two computer codes.

MEMBER BANERJEE: But HABIT does not have a heavy gas model? So, how does it handle heavy gas?

MR. PENG: You treat all gas the same.

MEMBER BANERJEE: But heavy gases don't disperse, right?

MR. PENG: Well, they used the test data as a dispersion coefficient for the --

MEMBER BANERJEE: Was that test data with heavy gases?

MR. PENG: I don't know that detail of the testing.

MEMBER BANERJEE: Which heavy gases?

MR. PENG: Like I say, I don't know what kind of heavy gas they used for --

MEMBER BANERJEE: So, how do you know this works for a heavy gas?

MR. PENG: Well, HABIT doesn't have to assume this is heavy gas. It just treats all gas the same.

MEMBER BANERJEE: But if it's a heavy gas, it disperses very differently from any other gas, right? So, some of these are heavy gases. So, how do you know that you're getting the right answer?

MR. PENG: Heavy gas is not necessary to mean this has to be -- you have higher control room in concentration.

MEMBER BANERJEE: But you have to get the concentration outside the control room correct, right?

MR. PENG: Right.

MEMBER BANERJEE: If it's a heavy gas, the behavior of the dispersion in heavy gases is very different. It's got nothing to do with any other gases. There's volumes written on this. Okay.

MR. PENG: In the heavy monitoring, they put all this, your concern, into three parameters. One is the literal dispersion coefficient. One is --

MEMBER BANERJEE: Heavy gases are not modeled that way. They are modeled, if you look at DEGADIS or HEGADIS, they are modeled very differently from what you're talking about. There's a gravitational effect and there's a dispersion due to that, and it stays together.

You know, there's a paper by Colin Brander, written back in 1975, or I can get you the reference, but it has nothing to do with the behavior of a normal gas.

MR. PENG: This is what HABIT did.

MEMBER BANERJEE: Well --

MR. PENG: Well, for heavy gas --

MEMBER BANERJEE: If it's not validated against heavy gases, then I don't think HABIT is worth using. I mean these are very heavy gases.

MR. PENG: Like you said, heavy gas will have a gravity impact. You fall on the floor. How come you can transport to the 4,000 feet away? In HABIT I assume just everything goes together. So, It can be conservative.

MEMBER BANERJEE: Yes, but, anyway, it's

not worth pursuing this further.

CHAIRMAN RAY: Okay. Did you want to say anything? Okay.

All right. Are we now done with this presentation?

MEMBER BANERJEE: The only action item that would be useful is to get a reference so we can see under what conditions HABIT has been verified.

CHAIRMAN RAY: Now is that something for the staff or for the applicant?

MEMBER BANERJEE: No, we want to take a look at this reference.

CHAIRMAN RAY: I know, but would we get this information from the staff?

MEMBER BANERJEE: From the staff, yes.

MR. SEBROSKY: Mr. Ray, it would be from the staff --

CHAIRMAN RAY: All right.

MR. SEBROSKY: -- because the licensing basis code of record is ALOHA, I think. I'm looking at Amy Monroe. What we just described was the staff's confirmatory calculation which used HABIT. I don't think they used HABIT in the same manner.

CHAIRMAN RAY: All right.

MEMBER BANERJEE: Yes, we understand what

ALOHA has. I think it's clear. You have DEGADIS, right?

CHAIRMAN RAY: All right, but the staff's use of this other methodology is something you're interested in getting information about?

MEMBER BANERJEE: Right.

CHAIRMAN RAY: Okay.

MEMBER BANERJEE: I think we understand what is in ALOHA.

CHAIRMAN RAY: Do you have anything more for the applicant, though? We were going to wait and make that decision after we had heard this presentation.

MEMBER BANERJEE: No. I think we'll look at the topography, but we have it ourselves and can look.

CHAIRMAN RAY: All right. So, nothing more for the applicant.

We want to follow up on what we have just heard here.

Now I've got to deal with a problem, which is we've got what I imagine is going to be an interesting discussion. But, in any event, I want to give it its due. You guys have been waiting to have it.

We also have, I believe, Vogtle on the line.

MR. WANG: Trying to see.

MR. CUMMINS: Five minutes, in five minutes.

CHAIRMAN RAY: In five minutes? They missed their window, Ed.

(Laughter.)

MR. CUMMINS: All right.

CHAIRMAN RAY: Because, I'm telling you, if you're not here when the bell rings, we've got to go ahead.

And, then, thirdly, we have lunch.

So, Bill, how long should we allow for the dialog that you would like to have.

(Sound on the phone.)

CHAIRMAN RAY: There's Westinghouse. Ten minutes.

Do you want to speak to anybody, Ed?

MR. CUMMINS: Yes. Is Vogtle on the line now?

CHAIRMAN RAY: I heard something that sounded like somebody coming on the line, but I guess not.

All right. We'll do 10 minutes on the --

what are we calling it, 2.5? And, then, we're going to break for lunch. And I'm very sorry, but I've done my best to try and juggle these balls, and that's where we are.

So, please proceed. I envision this as a discussion in which a response is being provided to some comments provided to the staff by ACRS. And so, let's proceed.

MR. HABIB: Okay. Again, this is for Section 2.5, geology, seismology, and geotechnical engineering. And the two staff members are Dr. Clifford Munson and Dr. Gerry Stirewald.

And we'll be talking about two issues. One is a followup action item from the July 2010 meeting, where we would be comparing the EPRI seismic source model used by the applicant to the most recent USGS model.

And, then, the second topic addresses field observations by the staff on geologic mapping of Unit 2 excavation.

DR. MUNSON: Okay. At the last meeting, Dr. Hinze raised the issue that the applicant looked at 2002 USGS for comparison with their models, but not 2008. So, we were asked to look at 2008.

This is the 2008 open file report for the

USGS hazard maps. Just a bit of background. Every six years, the USGS produces new hazard maps, and these maps are used for building codes, and they target ground motion return periods of 500 to 2500 years.

We don't specifically use these for siting nuclear power plants, but we do look at the source models that they used for comparison, just as a point of comparison.

So. the SSCs that we develop are 10,000 years at a minimum. So, these are targeting a different audience, so to speak.

This is information that was in the application. I will go through it really quickly, but the USGS --

CHAIRMAN RAY: Don't rush this because it's important.

DR. MUNSON: Okay. Okay. The USGS has a single maximum magnitude value for sources outside of Charleston in the region. In contrast to EPRI source models, there's several individual, distinct source models that have magnitudes that range from 5 to 7 with an average of about 6.2. So, the EPRI source models are much more detailed than the USGS map.

For Charleston, the source models are very similar with the maximum magnitudes 7.2 for USGS, 7.1 for EPRI, a recurrence interval for this large earthquake, 550 years versus an average of 630 years, and similar source geometries.

Can we go to the next slide?

So, here's a picture of the USGS source model for Charleston. The contours you see are ground motion intensities from the 1886 earthquake that was a magnitude of about 7. And the site you see with the star, the two rectangular shapes are their alternative interpretations of where the earthquake might have occurred, and they're equally weighted.

The little circles you see kind of scattered about are little earthquakes that occurred in the region. And, then, there's some little diamond shapes that are liquefaction features from the 1886 earthquake where the sand erupted and boiled to the surface where you had liquefaction features.

Next slide.

Contrasting that to the EPRI source model, it is a little more detailed, but they have four alternatives for where the earthquake might have occurred, what you see with those rectangular shapes. And they have a little bit of a larger area offshore than the USGS model does.

So, next slide.

What happened in 2008 is the USGS updated their source models. Instead of having a single magnitude 7.5, they went to more of a distribution that ranged from 7.1 to 7.7. They updated their ground motion models considerably, adding new models, and they also enlarged their Charleston source a little bit offshore.

Overall, the conclusion of this report is that the ground motion levels went down 10 to 15 percent from 2002 to 2008.

CHAIRMAN RAY: At the site? Or everywhere?

DR. MUNSON: Everywhere, yes. This is the value for peak acceleration for -- excuse me -- for 1 hertz acceleration. For the peak acceleration, it is more like 25 to 35 percent decrease. And that's mainly due to the new ground motion models that they incorporated in 2008.

So, in summary, the applicant did the comparison with 2002. If anything, the numbers have gone down for 2008. So, again, we don't use their results directly for comparison, but we do look at the models. So, that's what we have done for 2008. And this will be documented in our Safety Evaluation

Report.

That's what I have for that topic.

CHAIRMAN RAY: Okay, let's stop.

DR. HINZE: The 2008 also changed the magnitudes in the New Madrid area. Did that have any impact upon this area?

DR. MUNSON: No.

DR. HINZE: They also did some other machinations under Madrid.

DR. MUNSON: Yes, but that's more than a thousand kilometers away. So, we generally don't model that since it's quite so distant, and Charleston will dominate the low frequency ground motions. That wouldn't have an effect.

DR. HINZE: Is there any reason why the FSAR should not include 2008 as a reference because --

DR. MUNSON: It wasn't developed; it wasn't ready. When they wrote the FSAR, 2008 was not --

DR. HINZE: Is this going to be revised?

DR. MUNSON: We are taking it upon ourselves to add the 2008 to the SER. We did not have as an action item for the applicant to update their FSAR for 2008.

I don't know if you want to say something to that, Joe.

MR. SEBROSKY: No, that's a true statement. There is guidance that suggests that the applicant is required to consider items six months in advance of the date of their application. This, obviously, at the time of the application, I don't think this study was out.

If there was something in here that called into question statements in their FSAR, we might push for a change to the FSAR. But, as you just heard Cliff say, there isn't anything -- and, Cliff, I'm paraphrasing -- there isn't anything from this study that calls into question the statements that are made in the FSAR.

DR. HINZE: Cliff, my recollection of the document is that it stated 10 to 15 percent decrease across the area. But what you have stated here is 10 to 15 percent from the Southeast.

DR. MUNSON: It's more of across the whole Central Eastern U.S.

DR. HINZE: Yes, it's across the entire area. This isn't just the Southeastern U.S.

DR. MUNSON: Right, right, right.

DR. HINZE: So, that will be incorporated in these statements?

DR. MUNSON: Right. I will incorporate

that in the SER.

CHAIRMAN RAY: All right?

DR. MUNSON: That's it. Gerry has some pictures from the excavation.

DR. STIREWALD: I am Gerry Stirewald with a "G".

Thanks to Mr. Paglia for setting up the reason that we need to speak of this.

All we're going to do, this is simply just an update of what the geologists saw when we actually went to visit to the excavation early back in August and looked at what the rocks were. Our goal was sort of driven by something we spoke about at our July 2010 session. And in case you don't remember, I will gently remind. That was licensing condition 251-1. It essentially requires the applicant to do that mapping, to evaluate the features, and to let us know when it's ready to look at.

The logic for that was that in Unit 1 there were shear zones that were discovered by radiometric dating methods. They were certainly proven to be a minimum of 45 million years old. So, they were not young features. But the thing is that we anticipated, the applicant and ourselves, that these features might well show up in the excavation for 2 and 3. We wanted to take a look.

So, in August 2010, again, we did exactly that. We went down specifically to look at the features in the Unit 2 excavation to ensure that they were not, by every field association we could determine, they were not capable tectonic features.

Let me remind you what I mean by “capable”. That means they are older than Quaternary. If they are Quaternary or younger, which is a 2.6- million-year-old timeframe; if they are Quaternary or less, they’re potentially capable and we’re concerned about them.

Okay. Well, let me walk you to the site for a minute. Now we looked really carefully at this stuff. This particular field geologist, you might question, well, why is lying down? Well, it is foundation bedrock, after all, and this, in fact, is what it is.

(Laughter.)

This is granodiorite. That’s the unit that you see here.

This particular gentleman -- well, gentleman? -- this particular geologist happens to be looking at a fracture surface, looking at it to determine that there’s no -- certain features you could pick up would tell you if there had been slip along it. That was not the case for this.

As I say, I am looking at a fracture face in this rock, and the point was, again, to look at the tectonic features, to assure that there was nothing that was a capable tectonic structure.

Let me illustrate in two examples. The first slide that I want to show you is -- next one, please -- is a rather small-scale feature. I've got to stand and point. Geologists can't sit. That's not in our makeup.

This length of scale is 10 centimeters total. But what I want to show you is, certainly, there are tectonic features in these rocks. They're 300 million years old. They've been deformed several times. They do have deformation features in them.

But the issue is whether they're capable or not. If you look at this particular structure, I think even the engineers, Bob -- (laughter) -- can see that there's some sort of little shear zone that actually offsets this little pegmatite. Well, it turns out the shear zone itself is healed with igneous minerals. Aha, very old.

What you are looking at here is in the range of 300 million years old, including this structure, because it healed with quartz that sort of developed at the same time those intrusions occurred. This is a small-scale feature.

In the next slide, I want to show you a slightly larger structure. I think you can imagine that there's something that cross-cuts this particular part of the excavation. It's not intentionally fractured, something Dr. Hinze was questioning earlier, certainly not strongly fractured. But this, based on the field appearance, is, in fact, the shear zone.

DR. HINZE: Is that hydrothermally-altered?

DR. STIREWALD: I'm sorry?

DR. HINZE: Is that hydrothermally-altered?

DR. STIREWALD: The alteration that you are seeing here, no. The alteration you are seeing is actually due to very localized groundwater percolation down this zone. It was not a major flow path. It didn't alter the regional flow path. So, this is just groundwater. This is not hydrothermal. This is just groundwater percolation.

If you could see it in the field -- I wish I could take you -- it does look like a zone of shearing. But the point is, in this case, crossing this zone are two really nice igneous veins. These veins are in the range of 300 million years old. So, by definition, it is much, much older than Quaternary. So, consequently, even though we have these features, they are genuinely not capable tectonic structures, even though there are tectonic features.

And, then, the final slide, just by way of a reminder, what we did when we looked, and our goal was to determine whether or not what is in the FSAR 2.5, in fact, whether that was accurate. And based on the observations that we made to date, currently, only in the upper part of Unit 2, prior to blasting, are there tectonic features? Yes. Are they capable? No.

What we are going to do, again, as Mr. Paglia mentioned, we are going to do a followup visit. We are going to look at this after the blasting is over right down at foundation level. I suspect some of these features we will see that they penetrate to depth to some degree. It's -- what? -- 5 or 10 meters further down. So, it's going to give us that third dimension, but we have already qualified them relative to relative ages with respect to their not being capable.

So, we will do another look at Unit 2

after the blasting, and we will also do similar things in Unit 3.

Unless you have any questions, that's it.

MEMBER ARMIJO: I have a question.

DR. STIREWALD: Yes, sir?

MEMBER ARMIJO: Could you go back to your picture on slide 11?

DR. STIREWALD: Yes.

MEMBER ARMIJO: I just want to make sure I understand. Now the white zones are the igneous veins, is that correct?

DR. STIREWALD: Yes, sir, that is correct.

MEMBER ARMIJO: And they are filled with a different mineral than the granite --

DR. STIREWALD: They are. They are actually coarser-grained, what we call pegmatite-like quartz in feldspar. So, it is a very different mineral from what's here. That means they are really separate and distinct. We know they are later veins, yes.

MEMBER ARMIJO: And the fact that they remain straight going across the shear zone, does that imply that either the shear zone didn't move the rock very much or that the igneous zones occurred after the shear?

DR. STIREWALD: It at least indicates that -- well, this is a relative age. That is a good question. This is a relative age concept. What that indicates is that, after this vein happened, the rock didn't do this.

MEMBER ARMIJO: Right.

DR. STIREWALD: So, that's our relative age, but that's exactly what it does. Excellent. You're now a field geologist.

(Laughter.)

CHAIRMAN RAY: Anything else?

DR. HINZE: In the mapping of the overlying saprolite, was there any indication that there were offsets of any marker horizons within the saprolite?

DR. STIREWALD: Well, in these kinds of rocks, there aren't really what you might anticipate as a good marker horizon. You can see -- I mean what saprolite is, it is just simply the country rock that is weathered chemically in place. So, you can still see structures and features and rock types, but there is no place where there is any indication that it is other than this kind of geometry, other than this kind of age relationship.

But, certainly, they were mapped carefully by the applicant, very well done. We looked at it as well. But you can certainly see the structures. They're there, yes.

DR. HINZE: But not offset?

DR. STIREWALD: Very minor offset, no different than we saw here. Exactly the same kind of field relationships.

CHAIRMAN RAY: Anything else?

(No response.)

Thank you.

Is Westinghouse on the line?

MR. CUMMINS: Amy, are you on the line?

CHAIRMAN RAY: Okay.

MS. AUGHTMAN: Amy Aughtman is on the line.

CHAIRMAN RAY: Amy, sorry to have given you bum dope on when we would be ready to talk. I've had these people here for four hours. I've got to break for lunch. What's a good time for you later on today? Is it possible?

MS. AUGHTMAN: What time would you be coming back from lunch?

CHAIRMAN RAY: 1:30.

MS. AUGHTMAN: 1:30? Okay. I could probably do that. At that point, I just may be in a high-noise area then.

The other option I was thinking is, if you want to wait until the very end of the day, hopefully, I will have landed by that point.

(Laughter.)

CHAIRMAN RAY: Well, those are tough choices you give us, but --

MEMBER BANERJEE: Try 1:30.

CHAIRMAN RAY: -- we will try 1:30. If it doesn't work, we will go as a backup and hope that you get out of there and here in time to talk to us today.

And again, I apologize to you, but I can't keep people here for another 30 minutes while we talk about how you can help us with the letter we are trying to write. I'm sure you are wanting to do that, and we would appreciate your input.

MS. AUGHTMAN: Okay.

CHAIRMAN RAY: But, yes, go ahead.

MS. AUGHTMAN: No, I understand.

CHAIRMAN RAY: Okay. Yes.

So, we will break for lunch now.

Thank you, Amy.

We are due to take up LOLA next, but we will, if everything goes okay, talk instead to Vogtle about information that I think both Summer and we would like to get from them because of their role as the reference COLA.

And, then, we will close the session and take up loss of large area, topic 7.

With that, we will adjourn for lunch until 1:30.

(Whereupon, the foregoing matter went off the record at 12:37 p.m. and went back on the record at 1:30 p.m.)

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

1:40 p.m.

CHAIRMAN RAY: What I had hoped to do right now was just to go around the Members who are here with the Subcommittee and afford them the opportunity to identify things that they would like more information on to possibly resolve issues that, then, would either be made more clear in our letter that we're in the process of writing or might not have to be mentioned at all, depending on the outcomes.

So, I know time is short for all of us. So, I'm going to start, if I may, with Sanjoy Banerjee and ask him to just state as crisply as possible what it is that's on his mind right now that you might be able to provide some additional information on tomorrow.

MEMBER BANERJEE: Okay, Amy, it's Sanjoy.

I just want you to point me to the section of wherever you have treated the measurement uncertainty and how you have addressed Section 3.24 of the staff SER, which was written on the 16th, 2010. And that section really deals with what is called a measurement uprate request. This is not a measurement uprate request. I assume that SER somehow applies, even though it is not an uprate request. But I would like to have you just point me to the right section, so we can take a look at that.

CHAIRMAN RAY: Okay. Now that is a statement of the request. Any elaboration you want to give Amy, Sanjoy, elaboration meaning --

MEMBER BANERJEE: It is in the SER, what is required. There is a lot of stuff in the SER which requires licensees for plant installations where this flow meter is used but was not installed to show various things. I am not going to read out the requirements. She can look at that section and see.

CHAIRMAN RAY: All right.

MS. AUGHTMAN: Can you repeat the section number one more time, please?

MEMBER BANERJEE: 3.2.4.

CHAIRMAN RAY: And that's a section of an SER?

MEMBER BANERJEE: Yes, it is the staff SER written on August 16, 2010, about the ultrasonic flow meter measurement uprate request.

CHAIRMAN RAY: So, it's the use of that meter for measurement uprate requests that is the reason --

MEMBER BANERJEE: Yes. Now I assume that SER applies to this case.

CHAIRMAN RAY: That's what I was trying to get you --

MEMBER BANERJEE: Whereas, the SER really specifically is for uprate requests.

CHAIRMAN RAY: Right.

MEMBER BANERJEE: Now, assuming it does apply, the same sort of requirements that uprate requests have would apply here, I would like to know where that is discussed and addressed, so I can take a look at it.

CHAIRMAN RAY: All right. So, this is a case where the flow meter is being evaluated for the purpose of uprate requests, but it seems like what the SER in that case says is applicable here as well. Do I have it --

MEMBER BANERJEE: Unless there is another SER which I am not aware of, but this is the only SER that I have.

MR. CUMMINS: So, maybe I could help a little bit here. Ed Cummins.

The way Westinghouse, in some of our design basis accidents, used an error of 1 percent instead of 2 percent, justified by having a feedwater flow accuracy capability of 1 percent. That 1 percent feedwater flow accuracy is obtained by using this ultrasonic flow meter, and there are some special requirements on this ultrasonic flow meter that the staff wanted to make sure it was truly the 1 percent accurate ultrasonic flow meter.

MEMBER BANERJEE: Thanks, Ed. You have paraphrased it perfectly.

CHAIRMAN RAY: Anything further you want to ask, Amy, on this first point?

MS. AUGHTMAN: I don't think so. And again, these requests are for the Thursday full Committee discussion, correct?

CHAIRMAN RAY: For the what? Well, you could say we can't respond until then. That would be one response. Or you could say tomorrow here's the information you were looking for, and that would, then, avoid taking up time of the full Committee potentially.

MEMBER BANERJEE: Well, it could already be there. It is just that I haven't been able to find it. That's all.

CHAIRMAN RAY: Yes, I understand, but the point is they could answer tomorrow or they could wait until Thursday. But, personally, I would rather, and I think you would rather, we do it at the Subcommittee, so that we don't have to educate a larger group.

Okay? Got it?

MS. AUGHTMAN: Yes.

CHAIRMAN RAY: All right. Fine.

MEMBER BANERJEE: Do you have a copy of the SER, Amy? Otherwise, we will just send it to you.

CHAIRMAN RAY: Well, I think they can get it, no doubt, from their colleagues.

MEMBER BANERJEE: I have a copy.

CHAIRMAN RAY: If you have trouble getting it, contact us. But I'm sure you've got resources that can provide it.

Let me go now to Sam and ask if he has anything.

MEMBER ARMIJO: No, I don't have anything special.

CHAIRMAN RAY: All right. Thank you, Sam.

Dennis?

MEMBER BLEY: Yes, just to follow up on the PRA things we talked about the last time, Amy, I didn't actually get to see the PRA until a couple of days ago, and I haven't had time to rummage through it. And I got the document you sent about the containment debris treatment in the AP1000 PRA, and I appreciate those. I will be going through them.

But one particular point, and then the more general thing that I'm really interested in. In the material that was sent about the screen treatment, it pulls some numbers for failure of one screen and common-cause failure, which I would assume would be because of too much debris, from the Utility Requirements Document.

I don't have the old one from 1993. I have the one from 1999, Rev. 8. And in all of the data in there, there's absolutely none of that data that's in the Utility Requirements Document. I went through page by page all of the data. So, I would be interested in seeing that.

But the real crux to what I was interested in has to do with we have designed these plants to eliminate what we knew about risk from active components and did a great job of making those much, much less likely. But we have added in some reliance on phenomena that really ought to work its way into the PRA, not at this time for your COL, but I think before startup for the real one.

And just one example of why that might be important, suppose after you are operating we get an inspection finding that there was five times as much debris in the containment as allowed, and they go back through the process and take it to your PRA and say, "What's this do to the risk?" Well, nothing, according to the PRA because there is no place in there to account for that sort of thing.

You had noted that they show, I guess it's a raw value that, if the screens are unavailable, that the risk goes up by 6,000 times. So, there ought to be some kind of mechanism, even if we can't model it perfectly at this time, to have these phenomena in there, so that over time the models get better. And if something comes up that questions the assumptions behind those in the PRA, they fit into the programs that are set there, too, to oversee it.

So, again, I don't think it's something for today. It's something for in the future. But it seems to me that's important.

I would say, maybe a little differently than I did at the last time, having thought more about it, the approach that was taken in the DCD to have all COLs examine key aspects of the PRA in a qualitative, maybe semi-quantitative way, to make sure that there aren't any major impacts that would affect the risk at this stage, and if you saw some, that you would have to dig deeper, seems to me a pretty reasonable approach. Redoing the PRA at this point in time seems a waste until you get all the detail there to do it right before startup.

That was a long ramble, but --

CHAIRMAN RAY: So, the bottom line is, Amy, this is something that will get a comment in our letter, as it stands now, for the reasons that Dennis said. But it would be helpful if we could get any input from you that would make the comment more on target or useful or constructive. And so, that's what we're seeking from you.

MEMBER BLEY: And I don't know why the data on sump screens is no longer in the Utility Requirements Document. Maybe I missing it. Somebody could help me on that, if you can point me to it.

CHAIRMAN RAY: Enough on that, Amy?

MS. AUGHTMAN: I would like to open it up to Thom Ray to see if there's any clarifications he would like to seek prior to tomorrow.

CHAIRMAN RAY: He's coming to the microphone.

MR. THOM RAY: Yes, this is Thom Ray from Westinghouse.

No, I understand the two different issues you're looking for, for the URD and what would happen if, coming out of the outage, the material was --

MEMBER BLEY: And that would apply to not just -- we have been talking about the sump screens, but it would apply to all the phenomena we're counting on to get us through with no active system.

MR. THOM RAY: Yes. Yes, I got that.

MEMBER BLEY: Yes. Okay.

CHAIRMAN RAY: Okay. Let me move on to the third item. And for that one, I will speak to it. And then, when I get to Charlie, as we go around the table, he may want to add to it.

But let me just say -- and I am not looking for any comment from Vogtle on this, but I think it is useful for you to understand our continuing concern about the level of data protection provided for the Tech Support Center.

Let me say, also, that we understand that this is an industry requirement that you are in compliance with, but, nevertheless, cyber security is an emerging issue and, therefore, one that we can't simply say, well, we meet industry requirements; end of story.

But, in their presentation to us today, Summer talked about their TSC, which is not unlike yours in some respects, in that it's dealing with existing units as well as the new units. And in it, in their presentation, they referred to a part of the Technical Support Center called the Centralized Command Area. Well, that caused me to become alert again.

And they, later on, in talking about the TSC, said the following: “The TSC takes the lead in the onsite evaluations and decisionmaking for mitigation strategies in collaboration with the control rooms.”

The implication of those two things is that the TSC is doing something far beyond what the NUREG-0696 calls for them to do and that we ever allowed in any of the plants I have had anything to do with. But, nevertheless, it may be right.

And in any case, it does, again, present the question of what level of protection should be afforded to information in the Technical Support Center. That is something that came up in the discussion with you all. You will remember that.

I will just say that we are as interested in trying to run this issue to ground as ever and would understand it, as I said in the outset, to be generic in the sense that there are industrywide standards for what the Tech Support Center does. There are standards that we talked about in your

Subcommittee on cyber security, and we just perceive a possible disconnect between what we're being told the TSC is expected to do and what level of protection is provided for the data that are displayed in the TSC.

Having said all of that, you know, I could go on, also, about how we understand the TSC perhaps differently than these words imply that I just read to you. So, it's an area of active discussion.

My guess is, if we had to write a letter right now, we would probably acknowledge that this is not something that is at all unique to Vogtle or Summer, but requires some further review and affirmation at least of the existing requirements on the part of the Commission.

If you guys want to say anything further to us about this to help us decide, no, this shouldn't be a problem for the following reasons, you're invited to do so. If you don't want to, that's okay, too.

All right?

MS. AUGHTMAN: Okay. Well, we'll consult amongst ourselves and get back to you on whether or not there's additional information we would like to provide.

CHAIRMAN RAY: Thank you. Okay.

Mike, anything you want for Amy?

MEMBER RYAN: No, not now.

CHAIRMAN RAY: Charlie?

MEMBER BROWN: Nothing more on the subject you discussed. The only other issue, and it's not relevant, is the Rev. 18 issue, which is a more overarching-type thing.

CHAIRMAN RAY: Right. We're going to discuss that later today, I think Joe said.

MEMBER BROWN: That's it.

CHAIRMAN RAY: Okay. Joy, nothing from you?

MEMBER BROWN: Do they need to know what that issue is, just to know?

CHAIRMAN RAY: Yes.

MEMBER BROWN: The DCD references Rev. 17. Well, their FSAR references Rev. 17 of the DCD --

CHAIRMAN RAY: Right.

MEMBER BROWN: -- whereas, DCD 18, Rev. 18, is in my areas is a relevant rev. of the DCD --

CHAIRMAN RAY: Yes. Well, it --

MEMBER BROWN: -- for I&C and turbine overspeed.

CHAIRMAN RAY: I am not sure whether it is as simple as that or whether it goes to --

MEMBER BROWN: Yes, I understand that.

CHAIRMAN RAY: -- wait a minute -- whether it goes to the fact that you understand what Vogtle is going to do to comply, but you don't know what Summer is going to do to comply.

MEMBER BROWN: I don't know what either of them are going to do to comply right now. I do know what is presented by Westinghouse in Rev. 18, but what they're going to do with it, I don't know.

CHAIRMAN RAY: All right. Well, anyway, we will discuss that further. I don't think Amy needs to do anything there.

MEMBER BROWN: I agree. Thank you.

CHAIRMAN RAY: Thank you for calling in, Amy.

MS. AUGHTMAN: Thank you for these things.

CHAIRMAN RAY: Thank you. Bye-bye.

Okay, with that, we are now going to take a minute or two to close the meeting for discussion of large area fire or explosion.

(Whereupon, at 1:47 p.m., the proceedings in the above-entitled matter proceeded from open session to closed session and resumed in open session at 2:04 p.m.)

CHAIRMAN RAY: All right. The applicant first, I guess.

MS. MONROE: Okay. Now what we want to do is touch on Chapter 1, which is the introduction and the interfaces.

Amy Monroe again.

As you will start noting as we proceed through chapters probably a little more briskly, we will note that we have incorporated the DCD by reference in every chapter's case, and that we have incorporated the standard material, including any supplements, departures, or exemptions that the standard plant may have made. Additional site-specific material in our case has been added in 1.2, 1.4, and 1.8. And we also want to talk about a discussion departures and exemptions.

CHAIRMAN RAY: We are scrambling around looking for the hard copy. We are paying attention to you, but --

MR. WANG: We just tried to open a line.

CHAIRMAN RAY: Oh, okay.

MS. MONROE: As you will see here, this is the figure that we have seen multiple times before, but it is a good layout of the site. Appears Unit 1, Units 2 and 3.

Our site is located, the new unit site is located about a mile south of the existing unit in Fairfield County. The overall site is about 26 miles from Columbia, which is the nearest large population center.

If you will look, you will note that plant north is rotated about 68 degrees counterclockwise from true north. So, we need to be careful when we are talking about north and south, whether we are talking plant north and south or whether we're talking AP1000.

And while it has been mentioned several times before, the DCD reference plant grade of 100 feet equals 400 feet for us.

Briefly, the identification of the agents and contractors: the units are co-owned with South Carolina Electric and Gas and South Carolina Public Service Authority, or Santee Cooper. And it's a 55/45 percent venture. The financial information that is required was included in part 1 of our application.

We have an engineering procurement and construction contract consortium consisting of Westinghouse Electric Company and Shaw Group. They act as the AP1000 provider, the architect engineer, and the constructor.

Other technical support that we have utilized has been Bechtel to help attain the development of our COLA, MACTEC Engineering/Consulting for some of our geotechnical work, obviously, NuStart Energy, Rick Engineering, Tetra Tech, and William Lettis & Associates.

MEMBER BANERJEE: And Bechtel, I take it?

MS. MONROE: Yes, Bechtel.

Section 1.8 talks about interfaces for the standard design. I wanted to mention the departures and exemptions. We have a total of five departures. Two of them are standard and three of them are site-specific. There's both one standard and one site-specific departure dealing with simply numbering and organizational structure of the application.

There's also one standard departure in Section 8.3.2 dealing with the Class E voltage regulating transformer current limiting devices. Again, that is a standard departure.

There's one site-specific departure for the TSC OSC relocation, as we have discussed earlier today. And we have the site-specific departure and exemption dealing with our wet bulb.

We have two standard exemptions. One,

again, has to do with the numbering and labeling to get us in accordance with the regulations for the COL in general in comparison with the DCD. The other has to do with the requirements of 10 CFR 70, and what we have done is take the exemption to allow us to have the same requirements as Part 50 licensed plants.

CHAIRMAN RAY: Could you remind me of standard departure and standard exemption means they are the same are the RCOLA? Is that what it means?

MS. MONROE: Correct. We are taking the same departure and/or exemption for the same reasons and with the same technical support that the RCOLA did.

CHAIRMAN RAY: Okay.

MS. MONROE: Are there any questions?

(No response.)

CHAIRMAN RAY: No. That is fine for you.

MR. SEBROSKY: Again, my name is Joe Sebrosky, Project Manager for Summer.

We wanted to give you a brief overview of our philosophy for making presentations for the rest of the meeting.

The first bullet, we have already talked about, where we did have a Subcommittee meeting in July to talk about much of Chapter 2, and we talked about hydrology this morning.

The staff's philosophy for the remaining presentations, the two sub-bullets under there are meant to cover what we do not intend to make presentations about, but if there are questions, we will try to get answers to those questions.

We don't intend to brief the ACRS Subcommittee on any standards content material. And when I say "standard content material", sometimes we use words that can be confusing. An applicant incorporates by reference DCD Rev. 17. When we're talking about incorporating by reference, we're talking about incorporation of the material that's coming from the certified design.

When we talk about the standard content material, the philosophy of the design-centered review approach is that, when you go to the site-specific information that's outside the DCD, you will see that the AP1000 design center bifurcated that information. Some of the information has a standard left margin annotation, in which case the subsequent COLs either say that they are following that approach or they will let the staff know that they are departing from that approach.

So, you will see, and you saw in Chapter

18 in the slides that we presented this morning, where we gave an overview of everything that is in Chapter 18, and, then, we noted whether or not it was incorporated by reference, if it had incorporated by reference and standard material on it. And if it had, if it is wholly incorporated by reference and standard material, we don't intend to discuss it any more.

If you follow that philosophy and you look at Chapters 4, 7, and 14, there is nothing to present. It is all incorporated by reference and standard information. So, we don't have any prepared presentations for those three chapters.

Go to the next slide.

This slide is meant to give a philosophy on what we do intend to present. And that is, on a chapter-by-chapter basis, with the exception of 4, 7, and 14, is to go through all the information that is in that chapter that is site-specific and, then, brief the ACRS on a subset of those issues, as appropriate. The thought is that we would give you a breakdown of where the site-specific information is in a particular chapter.

So, having said that, that's kind of the philosophy on moving forward. What I would like to do now is just give an overview of the application and

FSAR Chapter 1.

When you look at our Chapter 1 of the Safety Evaluation Report and you look at the site-specific information, it is mainly done by project management and, also, the technical staff that is involved. Mr. Aaron Szabo is in the room. He did the financial review.

Go to the next slide.

On this slide, again, this goes to what I was trying to articulate earlier. The Summer application really consists of three things: the material incorporated by reference, and as the Subcommittee is aware, there is a certified design based on Rev. 15 of the application. And that is documented, our Safety Review is documented in NUREG-1793, and there are supplements associated with that. In addition, there is also a Safety Evaluation associated with the design cert amendment that the Committee has reported out on.

The next major part of the application is the standard content material, and when I say “applicable to all AP1000 COL applicants”, again, the applicants either say they are using the standard material or they let the staff know where they are taking deviations from the standard material.

If you look at the Summer's Safety Evaluation that we have provided to the Subcommittee, there's six parts of our Safety Evaluation. There's an introduction. There's a summary of the application. There's a regulatory basis, a technical evaluation, post-COL activities, and, then, a conclusion. One of those parts, the technical evaluation, is the meat of the staff's review.

And if you look at the Safety Evaluations again that we have provided, you can delineate the standard Safety Evaluation from the site-specific Safety Evaluations in any particular chapter. And the way we attempted to delineate that was the use of double-indenting and italicized. So, if it is double-indented and italicized in the Safety Evaluation for Summer, it is coming verbatim from the Vogtle Safety Evaluation.

And if you look at what was copied over and double-indented, as was discussed on the Vogtle application, Vogtle uses the same philosophy of double-indenting, but when they double-indent, they are taking credit for the work that was done on the Bellefonte Safety Evaluation.

So, I know it has been a point of confusion in the past, but when you look at the double-indented material that is in Summer, it comes from Vogtle. That is the bottom line. To the extent that Vogtle took credit for what was done on Bellefonte, you also see Bellefonte words in there.

Any open item, any standard content open item that was in Bellefonte was closed on Vogtle. All open items related to standard content were closed on Vogtle, and that's what you see copied over into the Summer application.

The last part of the application in Summer's COL application is the plant-specific information that I discussed.

CHAIRMAN RAY: Let's stop there, Joe, would you, before you go to the next slide?

I know this is a thing to be discussed perhaps later, but this just seems like a place that at least will help frame the issue for me. The major bullet on this slide is the "Summer application consists of". The second sub-bullet, sub-sub-bullet, says, "Staff's Safety Evaluation of AP1000 design certification amendment was completed and presented to the Committee."

Okay. That raises in my mind a question of, well, what status of the Summer application are we talking about in that Safety Evaluation? Which is it?

And how would you answer that question?

I guess, if we read the Safety Evaluation, it says, but --

MR. SEBROSKY: Ravi Joshi, who is the lead Project Manager for Vogtle, and I were talking about trying to present a graphic to the Subcommittee tomorrow to show how the design cert Rev. 18 is being included and will be included in the final product and considered in the Safety Evaluation Reports for both Vogtle and for Summer.

But, in essence, the thought process was the design cert amendment was based on DCD Rev. 17. However, there were many confirmatory, as the Subcommittee knows, there were many confirmatory items associated with that DCD Rev. 17.

DCD Rev. 18, which is the staff is in the process of reviewing and writing the Final Safety Evaluation Report the close out, there shouldn't be any new information in DCD Rev. 18 other than information to close out the confirmatory items. So, the staff's Final Safety Evaluation Report, it is intended to document the closure of those confirmatory items.

The thought at the time was the Subcommittee is not typically concerned about the process for closing out a confirmatory item. But it is my understanding we took an action that, if there is any new information that is in DCD Rev. 18 that requires an evaluation that goes beyond a confirmatory item, that we would come back and tell the ACRS that.

If you follow that philosophy on DCD Rev. 17 and DCD Rev. 18, that confirmatory Safety Evaluation Report that was written for the design cert amendment was reviewed by the staff that was doing the site-specific or was doing the Vogtle and Summer applications.

So, the philosophy, again, is that we knew what was coming in DCD Rev. 18, and we had a set of confirmatory items if it impacted the COL. We had a discussion of a post-DCD Rev. 17 Westinghouse change that would impact the COL, and it is described as a confirmatory item.

So, the thought process is there wouldn't be any new information in DCD Rev. 18, but that new information in DCD Rev. 18 was considered as we wrote the evaluation for Vogtle and for Summer. And if there were any questions about that new information, we would ask -- one of the prime examples of this goes back to the question that Dr. Banerjee has on the flow meter.

You do not see that 1 percent power

uncertainty as a COL information item in DCD Rev. 17. You will see it as an information item in DCD Rev. 18. So, the staff was aware of that, and that is why it was evaluated in the COL.

CHAIRMAN RAY: Well, maybe a graphic presentation tomorrow is the right way to try to close this out. I hope you will believe me when I tell you that there isn't anybody on this Committee who wants to try to track each of these items to ground. But the problem is with specific items, just like you mentioned, that they can -- and particularly when we're talking about something that has the potential for replicating itself through many, many plants without any further review -- it really is important that we have confidence that there isn't something going to fall through the crack; we thought it was this way, but it turned out the other way at the last minute kind of deal.

And that is why there is this interest. It isn't in trying to run each and every closure to ground, believe you me.

MR. SEBROSKY: Thank you. We understand, and the process is different than the normal process to provide information to the Subcommittee. We typically have only a handful of confirmatory items before we do make the presentations, but because of schedule issues, the thought was that we could try to use this philosophy. And I understand the confusion, frankly.

CHAIRMAN RAY: Well, yes, “uncertainty” is a better word maybe than “confusion”. But, in any event, we can talk about it tomorrow, as I said. We are running an hour or so late now.

MEMBER BROWN: I have got to make two comments.

One, you said that we had reported out on the DCD. And that report out on the DCD, if you go read the letter, did have Rev. 18 as a factor in what we reported out, not Rev. 17. My vision of that at the time was we certified or agreed with the direction of the staff based on Rev. 18.

You talk about confirmatory items. The items that were incorporated in the I&C area, or to be incorporated based on presentations, were to be incorporated in Rev. 18, but have not been -- I mean there’s a Rev. 18, but I haven’t gone back and read that. I don’t know what the staff has done with it.

Subsequent to that, and the point being, does that replicate those presentations in the manner which Westinghouse committed for the performance? And these were not confirmatory items. These were design methodology approach items and what is going to be configured. And that was in the DCD, not as, hey, we'll go look at this later as a closeout of a confirmatory item.

So, to me, that is my area for both the I&C as well as the overspeed trip. They were --

CHAIRMAN RAY: Yes, Rev. 18 wasn't submitted until December 1st. We wrote our letter very shortly thereafter.

MEMBER BROWN: Right.

CHAIRMAN RAY: And in the letter, we said the staff should make sure that the things that were committed to were done. So, I agree with you, it is not necessarily in the category of confirmatory items. It may simply be things that were to be included in Rev. 18, and we want to make sure they are.

And, then, the earlier question was, well, how do we make sure that those things, viewed now not in the DCD, but in the RCOLA, get incorporated as well and, then, thereby, become requirements for the SCOLAs?

What was the other thing you wanted to say? But we can talk about it some more tomorrow.

MEMBER BROWN: Fundamentally, those two

things. The reactor trip was fundamentally accepted, at least recommended to be proceeded with, based on the presentations, the oral presentations by the Westinghouse representatives -- I think was Mr. Jolet, who was very -- a lot of words in the transcript, brief information, not brief, but fairly detailed, but the explanation was what was important as to how it was supposed to be implemented. And that was key to at least assuaging my concerns relative to the independence of the various divisions in the reactor trip system.

So, that is of very strong interest relative to agreeing that everything is really still okay.

CHAIRMAN RAY: Yes.

MEMBER BROWN: And it's not Vogtle or Summer. I mean it is the DCD. They have to have it, and if they don't get it, then, they have to acknowledge Rev. 18 somehow.

CHAIRMAN RAY: But the same principle would apply to --

MEMBER BROWN: Yes.

CHAIRMAN RAY: So, all I'm saying, I think the point of all this is it's not necessarily a confirmatory item. It may be something which is simply reflected in Rev. 18.

And, then, there's stuff beyond Rev. 18, but, again, I think we go to the discussion that I think Joe wants to have tomorrow.

So, why don't you resume?

MR. SEBROSKY: Go to the next slide.

This is an overview of the 16 parts of the application. I don't want to go through each one of these, but there are some things that I wanted to point out.

If you look at part 1 of the application, the general and the financial information, that is where the financial information is provided and is the basis for the staff's review that is in Chapter 1 of our SER, specifically Section 1.5.1.

The majority of the staff's Safety Review is based on part 2 of the application, which is the FSAR.

Part 3 is the Environmental Report

If you look at parts 4 and 5, we talked about this a little bit this morning. Part 5 is the emergency plan, and we provided a brief of that this morning.

Part 4 is the technical specifications. The technical specifications will be pulled down and made part of the license. So, that part will cease to exist if the Commission does provide a license.

Part 6, there is no limited work authorization. That is why it is -- no limited work authorization request -- that is why it is considered not applicable.

Amy discussed the departures and exemptions. You will find those throughout the FSAR using the left margin annotation, but part 7 wraps them up succinctly.

The only other thing that I wanted to mention is, if you look at parts 11 through 16 and compare them with Vogle, you see some slight differences. There is no part 11 and 12 analogy in Vogtle. We received more subsurface information in part 11 and some seismic information in part 12 that were considered in our Section 2.5, Safety Evaluation. You don't see those same kinds of reports on Vogtle. Again, Vogtle referenced an early site permit.

CHAIRMAN RAY: Was the Seismic Technical Advisory Group discussed with this?

MR. SEBROSKY: Not that I recall. But if you want a presentation on what is involved with that, we can get Dr. Munson back down here.

CHAIRMAN RAY: Yes, we definitely do.

MR. SEBROSKY: Okay. I will make a note of that.

If you look at part 13, 14, 15, and 16, the information in there, we took credit for the standard review approach. So, although the QA, the quality assurance program description, there's some site-specific information in it, the majority of it is standard.

The mitigative strategies document, we talked about the site-specific differences. There are some site-specific differences.

The cyber security plan, there's essentially no difference between the RCOLA and the SCOLA application. And that is also true of the special nuclear material control and accounting program.

Go to the next slide.

So, this is a slide that we showed on Chapter 18. And again, it is the philosophy of trying to show on a section-by-section basis the amount incorporated by reference from the design cert and if there is any site-specific information or supplements.

And you will see that, in 1.2, 1.4, 1.6, .7, .8, and .9, and, also, .10, that there is some site-specific information, the majority of which we did not think rose to the threshold of briefing the ACRS.

If you go to the next slide, this is our one and only slide on the site-specific -- I'm sorry -- the technical topics of interest that we wanted to talk about. There's actually two slides. One, we wanted to run through the departures and the exemptions. Amy already talked about it. This slide gives more specificity, and the other slide is the one topic of interest that is in Chapter 1 that is site-specific.

Amy mentioned that there were three departures that were standard and, then, there's two site-specific departures. If you look at the third sub-bullet, the departure from the maximum wet bulb non-coincident air temperature is something that we have a presentation coming up on in Chapters 5, 6, and 9.

The emergency response facility location, we already talked about that. Both Vogtle and Summer have a TSC, a common TSC, that is outside the protected area. Even though Vogtle and Summer have that, not every AP1000 unit is requesting that departure.

So, that's why, if you looked at the

Chapter 18 presentation, the way you can tell a standard from a site-specific is a standard item has an "STD" in front of it; site-specific information, in the case of Summer, has a "VCS" designation in front of it. So, even though we used the common review approach, that is, in both Vogtle and Summer's cases, considered a site-specific departure.

Regarding the exemptions, there are three of them. The first exemption is associated with the organization and numbering. We discussed this briefly when we made the 2.0 presentation back in July. The numbering is different than what's in the DCD. It makes the application flow better, and the staff's Safety Evaluation, also, to a large extent, relied on that same numbering scheme. We don't have any further presentations on that.

We do have a presentation planned on the exemption for the maximum safety wet bulb. And as I indicated, that will be coming up after this.

There is a standard, so to speak, exemption associated with the special nuclear material exceptions. Ravi discussed that during the Vogtle RCOL presentation. We don't have any more information on that.

If you go to the next slide, the one topic of interest that we thought the Subcommittee may be interested in is the financial and technical qualification review.

CHAIRMAN RAY: Why would we be interested in that?

MR. SEBROSKY: Well, to answer the reason why, there's only six findings, if you look at 5297, there's only six findings that the Commission has to make in order to grant the license. And one of the findings in 5297 is that the applicant is technically and financially qualified.

So, it is from the perspective of --

CHAIRMAN RAY: Technical qualification I guess is what makes the relevance here. And certainly, we're not competent to talk about the financial qualifications.

MR. SEBROSKY: That is the only reason we wanted to point it out to the Subcommittee, is because of the importance that it was given in the 5297 granting of a license.

CHAIRMAN RAY: Okay.

MR. SEBROSKY: We don't have any other presentations. So, we can move on to the next presentation.

CHAIRMAN RAY: All right. Well, we can,

except that, if anybody wants to get any coffee, it is rapidly running out downstairs.

(Laughter.)

So, we're going to take a 15-minute break now because I need it, if no one else does.

(Laughter.)

(Whereupon, the foregoing matter went off the record at 2:35 p.m. and went back on the record at 2:48 p.m.)

CHAIRMAN RAY: Okay. It looks like we're ready to go. So, we will come back on the record, please and resume our meeting.

Excuse me. We are now at Chapters 5, 6, and 9.

And as usual, we will start with the applicant.

MS. MONROE: Mr. Mark Stella from Westinghouse will be giving primarily the discussion on our site-specific wet bulb temperature exemption. That encompasses Chapters 5, 6, and 9. So, he's going to go through and talk to the different points that are covered in all three of those chapters.

After that, we will follow with a very brief discussion on items in Chapter 5, 6, and 9 that are of interest potentially to the ACRS that were not included in the wet bulb exemption portion. But, for now, we just want to talk about the wet bulb exemption.

Mr. Stella?

MR. STELLA: Thank you, Amy.

The historical basis of the AP1000 maximum safety wet bulb temperature was the zero percent exceedance temperature. It was actually defined in the EPRI URD and brought over into the AP600, and, then, carried over into AP1000. So, that has always been the basis for setting the maximum safety non-coincident wet bulb temperature.

The original Summer site with zero percent non-coincident value was within the existing DCD Rev. 17, now Rev. 18, maximum safety non-coincident wet bulb value. So, the site met the conditions in the DCD.

However, during the COLA review, the staff asked the utility to look at a different measure of maximum safety wet bulb. They actually wanted the utility to generate a 100-year return maximum wet bulb temperature and compare with the zero percentage exceedance value. When that was done, it was determined that that value was about 1.2 degrees higher than the 86.1 degree Fahrenheit maximum safety non-coincident wet bulb temperature value that was specified for the standard AP1000 site.

This isn't an unprecedented occurrence because, in looking at the Turkey Point site, it was determined that there was a similar difference between the maximum non-coincident wet bulb, as defined in the AP1000 DCD, and the actual site conditions.

The issue associated with the increased wet bulb temperature is that it may affect the performance and/or the design of both safety and non-safety systems that use wet temperature basis for determining how well they perform in hot conditions.

Go to the next slide. Okay. Just this one.

The exemption request is actually to allow VC Summer to use 87.3 degrees Fahrenheit as its maximum safety non-coincident wet bulb temperature in lieu of the 86.1 degrees that is now in the AP1000 DCD. In order to do that, we had to demonstrate that the systems and components that were affected, or potentially affected, by this temperature increase would still perform acceptably with the higher temperature.

We did a number of quantitative evaluations to determine the extent of the impact. We used work that had been performed before because, the Committee may remember, the original AP1000 maximum safety non-coincident wet bulb temperature was 81 degrees, and it was increased in two steps to 86.1, where it still sits.

There are two principal modes of impact that we looked at. One was a direct effect on systems that use wet bulb temperature as the measure of their performance as an input into their performance, and indirect effect on systems that are cooled by CCS because the CCS is affected through the SWS cooling tower performance, which is a function of wet bulb.

There are several DCD areas that were looked at and assessed as to the effect on the performance, the most important of which was the passive containment cooling system performance. It is directly impacted by change in wet bulb temperature.

We used WGOTHIC as a means of assessing performance of the containment, and using the standard WGOTHIC analysis with the 87.1-degree -- I'm sorry -- 87.3-degree wet bulb temperature indicated that there was essentially no measurably increase in containment pressure for the design basis accident, but it was the most restrictive.

The increase was in the hundredths of a

degree Fahrenheit. So, our conclusion was that the use of 87.3 degrees was acceptable for this particular aspect of the AP1000 performance at the Summer site.

The next most important measure that was looked at was the steaming of the IRWST and the cooling of the IRWST during normal operation. The steaming analysis is done assuming that PRHR is actuated and the RNS heat exchanger is used to cool down the IRWST with the CCS temperature at the maximum imposed by the higher wet bulb temperatures.

We looked at this and found that, although the temperature in the IRWST went up a few degrees due to the increase in maximum safety wet bulb temperature, that the temperature remains well below saturation. So, there's no steaming to the containment. This is an investment protection requirement.

The next evaluation was the CCS temperature during plant power operation Our target value for CCS temperature is 95 degrees, and the maximum temperature allowable is 100 degrees. That is set by the reactor coolant pump cooling water supply temperature.

With an increase in the maximum safety wet bulb temperature to 87.3 degrees, the maximum CCS temperature reached is about 97.3 degrees. That persists for a brief period of time, perhaps two hours, and then is reduced as the wet bulb temperature drops back down.

So, our conclusion there was that this was also acceptable. It is supported by the fact that the reactor coolant pumps, as you probably know, have four RTDs that measure their cooling water temperature during operation. These are safety-grade RTDs and read out in the control room. So that, if the temperature of the cooling water approaches a level of concern, something can be done to bring it back down to a normal level.

So, our conclusion was that, for normal plant power operation, the 87.3 degrees was an acceptable temperature.

MEMBER BROWN: What is the setpoint for those?

MR. STELLA: For the reactor coolant pumps?

MEMBER BROWN: Yes, the cooling water temperature that they go off at. The reason for my question being, if it's real hot, then you have now allowed this number to go -- you won't be warned until the number can be pretty high. And it may have some other impact. That's all.

MR. STELLA: I don't know the exact numbers. I can give you some general numbers. I think ballpark numbers, I think the reactor coolant pumps normally around 150 degrees when the plant is at power and they are operating at 100 percent speed.

MEMBER BROWN: That is the cooling water temperature --

MR. STELLA: That is the cooling water temperature inside the pump. The CCS supplies the heat exchanger that cools that water as it circulates through the pump.

A large setpoint is 180 degrees, and the trip setpoint I believe is somewhere around 185.

MEMBER BROWN: That is a pretty high number relative to 95 or 97 or 98.

MR. STELLA: Right.

MEMBER BROWN: That is the only reason I bring that number up. I don't know how those numbers could go higher, based on this, but it is just a point of interest.

MR. STELLA: The next performance aspect that we looked at was component cooling water system temperature during cooldown. Again, that is an issue because, as you cool a plant down, you bring more heat into the CCS to reject it through the service water cooling towers; CCS temperature will rise. And the limit there, again, is set by the reactor coolant pumps. It's 100 degrees Fahrenheit for six hours or less.

This performance criterion wasn't really affected by a change in the maximum safety wet bulb temperature because we used the maximum normal temperature, which is the equivalent of a 1 percent exceedance value. And on AP1000, it is 80.1 degrees Fahrenheit. We used that number to assess cooldown performance and the time-to-temperature performance, which is 350 degrees to 125 degrees within 96 hours.

There are a couple of performance requirements related to spent fuel pool temperature that are also potentially affected by an increase in the maximum safety wet bulb temperature. The one that we found that was affected is the plant power operation following a startup after a normal refueling. Because your spent fuel pool has the highest heat load fuel in it, you bring your plant back up to power, and our analysis approach requires us to use the maximum safety wet bulb temperature as the input temperature to do this calculation.

We must keep the spent fuel temperature

below 120 degrees Fahrenheit for this particular situation. And with the 87.3 degrees Fahrenheit temperature, it stays below 115 degrees. So, we met that criterion.

There is also a full core offload or emergency core offload criterion, but, again, that criterion is calculated, the performance is calculated on the basis of the maximum normal wet bulb temperature, which is the equivalent of the 1 percent exceedance value. So, the change in the zero percent exceedance value did not affect the performance of the systems for Summer for those situations.

The maximum cool water temperature at the beginning of cooldown is limited to less than 88.5 degrees Fahrenheit. But, again, that's not affected by an increase in the maximum safety temperature because that is a performance criterion that is evaluated at the maximum normal temperature.

The last performance area that would potentially be affected is the performance of the central chilled water system. On AP1000, we have two subdivisions of the chilled water system.

We have a high-capacity system which services most of the cooler loads in the plant during plant normal operation. Those are large water-cooled chillers that are cooled by the CCS. If the CCS temperature increases due to the increased maximum safety wet bulb temperature, it stays well below the maximum operating temperature for the water-cooled chillers. So, there's no impact on their capacity.

The other part of the chilled water system that is affected is the low-capacity chilled water system. That is serviced by two 100 percent sized air-cooled chillers. Of course, the air-cooled chillers themselves are not impacted by change in wet bulb temperature because they respond to dry bulb temperature only.

But the increased humidity and temperature associated with the maximum safety wet bulb temperature increase causes an increase in load on the VBS chillers which provide cooling to the main control room, the battery rooms, to maintain the conditions as assumed in the safety analysis for the plant.

And we looked at that. We had extensive margin in that capacity for those HVAC units. The EPRI URD requires at least 15 percent margin. We had more than that. So, we just absorbed some of that margin, and by a rebalancing of the loads, there's really no impact on the performance of the VBS, either.

The additional load that is required does not affect the load capacity chillers because they are not loaded to full capacity. They are operating at about 60 percent capacity at this point with all the loads at maximum. So, we had plenty of capacity there.

Just to reiterate, the systems that are affected, the SWS cooling tower sizing, which would be impacted by change in wet bulb temperature, is not affected, actually, because we size at the 1 percent maximum normal wet bulb temperature for cooldown. So, that was not affected by the increase to 87.3.

Spent fuel cooling, except for the return to power after normal refueling, was not affected, and none of the steam and power conversion systems, for example, the circ water system or the turbine building cooling water system that supplies cooling to the turbine generator loads, that was not affected by the increase in maximum safety wet bulb.

So, the bottom line from all these analyses was that the AP1000 standard systems design was completely acceptable for use with the increased maximum safety wet bulb temperature at the Summer site. And there was no impact on the other systems that used maximum normal temperature because there was not an increase in that parameter at the Summer site compared to the DCD standard value of 80.1 degrees.

Any questions?

MEMBER BROWN: Just one.

MR. STELLA: Yes.

MEMBER BROWN: Excuse me. I just don't remember this. This is information. I presume there is a readout for the cooling system temperature in the main room?

MR. STELLA: For the reactor coolant pump?

MEMBER BROWN: No, for the component cooling for the system.

MR. STELLA: Oh, yes. Yes, we have temperature readouts for both the service water system temperature and the CCS temperature, and we have alarms that indicate when they are verging towards unacceptable temperatures. So, we know exactly what is happening.

MEMBER BROWN: And where are those alarms set? I mean 100 degrees, 92 degrees?

MR. STELLA: For the CCS, the alarm currently is set at 95 degrees. So, during high wet bulb conditions, those brief periods of time when the transient takes you above the standard wet bulb temperature condition, you will get an alarm that will allow you to know that you are there. So, the operator can take a look at it and look at the performance of his service water system, look at the cold water temperature, and make sure there's nothing wrong with the performance of the service water tower, either the fan isn't operating at the right speed or --

MEMBER BROWN: Does that run the risk of having -- let's see, I've forgotten what your number is. The wet bulb temperature in this case is some number of degrees above --

MR. STELLA: 1.2 degrees above the standard --

MEMBER BROWN: Yes, above the DCD value, right?

MR. STELLA: Yes.

MEMBER BROWN: And does that mean you could, then, have some, I guess, non-inconsequential, but I guess they are not spurious, but they would be given an alarm when, in fact, it's a number that you are not concerned about?

MR. STELLA: Well, I think as the operator, you --

MEMBER BROWN: As an upper margin, not a good thing --

MR. STELLA: You would need to know when

you had this condition applying. The operator doesn't normally look at the --

MEMBER BROWN: Let me rephase the question. Does the increased limit for wet bulb temperature that you are taking in saying, hey, we've got to have this, I guess I called it -- it's just a higher number -- a departure, I guess for the analysis, and if you actually achieve that number, will you then exceed the alarm value that you have got set in there now?

MR. STELLA: Yes, you will.

MEMBER BROWN: And if that is considered okay, why isn't the alarm raised right above that, so you don't have inadvertent alarms for something that you have said is acceptable? It doesn't affect any systems. It doesn't impact spent fuel or any other critical systems or safety systems. Therefore, based on your comments throughout this thing, why would you have this alarm just go off because it went above something you have already gotten agreement to have?

MR. STELLA: Well, I think we would like the operator to be aware that we are in this --

MEMBER BROWN: I'm sorry. My personal experience is you don't have alarms go off for what you would consider potential normal operating conditions.

That is the program I come from. So, you don't want to distract the operators.

MR. STELLA: Well, I'm not sure --

MEMBER BROWN: That's just my own thought. I'm not telling you to change anything. Excuse me. I'm not asking you to, or any other thing. I was just curious as to why. That just seems that is not a good way to do business, to have alarms go off just to let a guy be aware that it is -- I want him aware when it is a problem, not when it is a non-problem.

MR. STELLA: Well, I think we still have a chance to address that. So, we will consider your comment.

MEMBER BROWN: Okay.

MR. CUMMINS: This is Ed Cummins.

That is a human factors kind of comment.

MEMBER BROWN: Yes.

MR. CUMMINS: And we haven't gotten the human factors people engaged in this yet.

MEMBER BROWN: Okay. Thank you.

MEMBER BLEY: Just based on what Charlie just asked you --

MR. STELLA: Yes.

MEMBER BLEY: -- back to the beginning, how often does this condition occur? It was pretty rare, right?

MR. CUMMINS: It is a 100-year return temperature.

MEMBER BLEY: So, you aren't going to have alarms going off. Okay. That's what I thought.

MR. STELLA: Statistically, I think for a 60-year plant operating, like a 100-year return temperature, you would see that number with a 50 percent probability sometime during the 60 years of plant operation. I think, if you look at the statistical tables, that is basically how it comes out.

MEMBER BROWN: My comment still stands.

(Laughter.)

MR. STELLA: And I will consider it.

MEMBER BROWN: We don't ever expect this to happen, but, then, how many times in the working of the world do we see these things happening?

So, thanks.

CHAIRMAN RAY: Okay.

MR. STELLA: You're welcome.

CHAIRMAN RAY: Staff?

MS. MONROE: Well, I think what we would like to do, if it is acceptable with the Committee, is to go ahead and finish up the rest of Chapters 5, 6, and 9.

CHAIRMAN RAY: Yes, of course. I guess I was derailed by the questions. Go ahead, yes.

MS. MONROE: Well, this will be pretty quick. This will move fast.

All right. This is Amy Monroe.

Again, what I am going to do is go ahead and cover the additional information in Chapters 5, 6, and 9 that we felt was appropriate to address the Committee with outside of the wet bulb situation.

Actually, in Chapter 5, had we not taken the wet bulb exemption, it would probably have run into the same category as Chapters 4, 7, and 14. There wouldn't have been anything we needed to address further with the Committee.

In Chapter 6, again, we incorporated the DCD by reference and, then, also included all the standard material. As we have just finished discussing, we had the wet bulb exemption that touched on different parts of Chapter 6, and there are portions of Chapter 6 that address chemical hazards, but for us, we identified all of our chemical hazard evaluations in FSAR Chapter Section 2.2.3. So, there is nothing else we need to address in Chapter 6.

In Chapter 9, again, it is an

incorporation by reference of the DCD and the standard material. Again, the wet bulb exemption and departure had some input into it.

The only other couple of items we wanted to address in Chapter 9 deal with the service water system cooling towers and just to touch on the raw water system.

We did look at the service water system cooling towers to see if they had any, based on site-specific layout and having two units co-located, whether there was a possible interaction with an adjacent unit. We looked and determined that there were no adverse impacts.

Raw water, while it has no safety-related function in the failure of the system, will not impact the ability of the safety system to perform its function. We thought we would just mention the fact that it utilizes the HDPE piping, and its primary functions are to provide makeup water to the circulating water system basins, the mechanical draft cooling towers we have. It provides filtered water to the surface water system cooling tower basins for makeup. It provides water for the primary and secondary fire water tanks for fill and makeup.

CHAIRMAN RAY: Amy, did you back up the

slide that is projected somehow?

MS. MONROE: Which one did you ask that we --

CHAIRMAN RAY: Well, it was on “Questions”, and it looked like you were still --

MS. MONROE: Oh, I’m sorry.

I have nothing more to add.

CHAIRMAN RAY: All right.

MS. MONROE: Questions?

CHAIRMAN RAY: Any questions on these items?

(No response.)

If not, we’ll turn to the staff then.

MR. HABIB: Thank you.

My name is Don Habib, and this is a presentation for Chapters 5, 6, and 9 for the Summer COL with a focus on the departure and exemption for the wet bulb non-coincident temperature.

The staff conducting the review:

For Chapter 5, Steam and Power Conversion, is John Budzynski. He’s here today.

For Chapter 6, Engineered Safety Features, there were two reviewers, Michelle Hayes and Shie-Jeng Peng.

And for Chapter 9, Auxiliary Systems,

Larry Wheeler and Raul Hernandez, and Larry is here today.

And the Project Managers are myself, Joe Sebrosky, and Sujata Goetz.

There were six evaluations that were affected by the departure. These are basically the same ones listed by the applicant.

And the departure was to the maximum safety wet bulb non-coincident air temperature by an increase of 1.2 degrees, and this was based on a 100-year return temperature.

There were two other temperature values. The maximum coincident wet bulb temperature did not change, and, also, the maximum dry bulb temperature. They have not changed. Those are the same as in the AP1000 DCD.

And I will turn it over now to the technical reviewers.

MR. BUDZYNSKI: Yes, my name is John Budzynski, and I did a review on Chapter 5 for the normal heat removal system.

And I had three concerns. The first two concerns were plant cooldown from 350 degrees down to 125 degrees in 96 hours, and the other one was keeping the IRWST temperature below 120 degrees normal operation. Since both these are affected by the maximum normal wet bulb temperature, which wasn't changed, there was no impact on these two.

Then, the third one was the convention of steaming of the IRWST during an abnormal event, a reactor trip where a PRHR is placed into service, and approximately two hours later the RNS is placed into service. I found no problem with keeping it below the steaming point, 212 degrees.

Any questions?

(No response.)

No?

MS. HAYES: I'm Michelle Hayes. I'll talk about the containment systems and the AP1000 DCD.

The limiting initial conditions for the containment safety analysis were the maximum dry bulb with a coincident wet bulb, and neither of those values changed. But just to be safe, Summer performed an analysis where they combined the non-coincident wet bulb temperature with the maximum dry bulb, which, in effect, changed the relative humidity from 31 percent to 34 percent, and they reran the analysis, the double -ended cold leg break, which gave the peak pressure, and demonstrated that it was the second significant figure that changed. And so, the DCD only reported values to the first significant figure. So, essentially, there was no change to what was reported in the DCD.

And this is expected because the containment heat removal is dominate by the evaporative cooling, and during this accident we have the water coming over the top. So, you would expect the external relative humidity to have a minimal effect.

The staff ran confirmatory analysis with CONTAIN, which is what we used during the AP1000 DCD review, and reached the same conclusion. And, then, we also reran the air-only cooling analysis to demonstrate that the containment pressure could be maintained below the design value for seven days with no PCS water released.

So, this departure had no impact on the containment review.

And next up is Peng.

MR. PENG: Hi. My name is Shie-Jeng Peng, again.

To evaluate the impact of the departure on the control room habitability systems, I started to look at the design document. I find that the wet bulb safety temperature is the one used for everything to calculate their heat load for low-capacity the chilled water system. And this system is also used by the VBS. That is the nuclear island non-radioactivity regulation system. This system is used by the main control room HVAC if the AC power is available.

The next slide.

We had some questions. I had a response from the applicant that was very clear. First, they said their design calculation does already bound the condition which raised the wet bulb temperature. Also, they said they have margin to cover any other uncertainties.

So, staff go ahead to audit their calculation note and conduct a public meeting. Staff finds that the applicant has provided reasonable assurance that the increase of the wet bulb temperature of 1.2 degrees will not have any safety-significant impact on the control room habitability.

MR. WHEELER: I'm Larry Wheeler, Chapter 9 reviewer.

A little bit of a systems review here. Spent fuel pool cooling and central chilled water systems are cooled by component cooling. Component cooling is cooled by service water. So, with the wet bulb at 84 degrees or less, normal CCS temperature is less than 95. As the wet bulb temperature increases, the CCS temperature increases.

Calculations were reviewed by the staff at the audit. The same methodology was used to support the wet bulb changes in the AP1000 Rev. 16 and, also, more recently, the Rev. 17 due to the lead COL. No equipment changes were needed due to the wet bulb change to 87.3.

Next slide.

For spent fuel pool cooling, the design parameters of spent fuel pool is less than 120. The CCS water temperature rises from 97 to 97.3. It's a delta of .3 due to the increase in the wet bulb going to 87.3. With a CCS water temperature of 97.3, spent fuel pool temperature remains below 115. Staff concludes the spent fuel pool remains within design parameters of less than 120.

Next slide.

Component cooling system. The AP1000 DCD states that a normal CCS supply temperature to plant components is no more than 100 degrees. As previously stated, normal CCS water temperature is less than 95 with the wet bulb at 84 degrees or less. As previously stated, CCS water temperature rises from 97 to 97.3. That is a delta of .3.

The higher wet bulb temperature conditions are expected to be of short durations, a period of less than two hours, estimated to occur 30 hours per year. And I think that was one of the questions: what kind of duration are we talking about, this higher wet bulb temperature? It is somewhere around less than 30 occurrences per year. And that was in the RAI response.

Next slide.

As previously stated, reactor coolant pump motors are limited to 100 degrees for six hours. The CCS RTNSS functions for Mode 5 and 6 is to remove decay heat. For these modes, there is significantly lower heat loads and no RCPs are operating. Reactor coolant system cooldown uses the 80.1 wet bulb for CCS. Staff concludes that CCS remains within design parameters less than 100 degrees.

Next slide.

The central chilled water system supplies chilled water to various HVAC systems. These are non-safety. It consists of two closed loop subsystems, the high-capacity chilled water and the low-capacity chilled water.

The high-capacity chilled water has water-cooled and air-cooled chillers, the majority of the plant HVAC loads, radwaste, control access, and the auxiliary building.

Low-capacity chilled water only has air-cooled chillers. It supplies the nuclear island nonradioactive ventilation system, the main control room, the CVS makeup pump unit coolers, and the normal RHR compartment unit coolers.

Next slide.

CHAIRMAN RAY: Go back one slide.

MR. WHEELER: Yes.

CHAIRMAN RAY: Go back. One more.

What does that first bullet mean? What are we talking about? Are you talking about the exit temperature of the --

MR. WHEELER: This is the component cooling --

CHAIRMAN RAY: -- CCW water coming out of the pump? Is it 100 degrees? That's all?

MR. WHEELER: The reactor coolant pump motors are limited to 100 degrees for six hours. This is the component cooling side.

CHAIRMAN RAY: Okay. So, that's the outlet from the heat exchanger --

MR. WHEELER: This is downstream of the heat exchanger. This is the water going to the RCP motors. That's their limit, is 100 degrees for no more than six hours.

CHAIRMAN RAY: And the rest of the time, what does it run at?

MR. WHEELER: No, this is their limit.

CHAIRMAN RAY: I know that. I'm just asking, does it run at 99 degrees the rest of the time?

MR. WHEELER: Normally, it runs less than 95. As you get up into this higher wet bulb, you're going to approach 97.3.

CHAIRMAN RAY: Yes. That just seems awfully low to me. I'm just staggered that the CCW outlet temperature is less than 100 degrees under normal operating conditions. That's amazing.

MR. WHEELER: What we're saying is, under these upset conditions where these high wet bulb conditions exist, around 30 times a year, you're going to approach 97.3 degrees. So, we still have about a 3-degree margin to this 100 --

CHAIRMAN RAY: I know. I was just surprised that the temperature was that low. It seems awfully low for the CCW water coming out of the reactor coolant pumps.

MR. CUMMINS: This is Ed Cummins.

That is the inlet temperature, 100 degrees inlet temperature.

MR. WHEELER: It's the CC inlet temperature.

CHAIRMAN RAY: Thank you. It's not the outlet.

MR. WHEELER: It's not the outlet.

CHAIRMAN RAY: Okay. Much better. Thank you.

(Laughter.)

MR. WHEELER: CCS supplies --

CHAIRMAN RAY: But what it literally says is the reactor coolant pump motors limit. And I figured there's no way in the world that that motor could be limited to 100 degrees. So, it's the inlet temperature. Well, I should have figured that out, I guess, but --

MR. WHEELER: Yes, because we're talking component cooling water system supply to the RCP motors.

CHAIRMAN RAY: Okay.

MR. WHEELER: Sorry for the confusion.

MEMBER BROWN: It's 100 degrees going into the cooling coil on the pump?

MR. WHEELER: Yes.

CHAIRMAN RAY: Yes, yes.

MEMBER BROWN: Okay.

MR. WHEELER: For CCS.

CHAIRMAN RAY: Yes.

MEMBER BROWN: That makes a whole lot more sense.

CHAIRMAN RAY: Yes, but, I mean, literally, it said the motors. I know that wasn't right. So, then, I asked him, was it the outlet, and I thought he said yes. But, no, it's the inlet. Okay. Fine.

MR. WHEELER: The inlet water supply to the motors.

CHAIRMAN RAY: Okay.

MR. WHEELER: Back to slide 13.

The nuclear island nonradioactive ventilation system is the only HVAC system designed to accommodate the maximum safety temperature limit. The higher maximum safety ambient wet bulb temperature of 87.3 can be accommodated with available capacity margin of the chillers.

The HVAC calculations were reviewed by the staff at the audit. Essentially, their calculations originally had 164-ton load and it was changed to a 182 tons. And the equipment is rated at 300 tons.

So, there is no equipment change required. So, they essentially ate into their margin.

The VBS air-handling unit has cooling coil and system margin. And the staff concludes that the VBS has adequate system margins.

Next slide.

The staff concludes for these three systems that the increase in maximum safety wet bulb non-coincidental air temperature from 86.1 to 87.3 is acceptable because the spent fuel pool is less than 120; the CCS is less than 100, and existing margins remain adequate.

Any questions?

CHAIRMAN RAY: CCS meaning the inlet temperature. Okay.

MR. WHEELER: That's right.

MEMBER ARMIJO: What happens to the pump if you go above 100-degree F inlet water temperature?

MR. WHEELER: That I would have to refer to Westinghouse.

MR. STELLA: I can address that.

If you go up above 100 degrees water temperature, it is not an immediate, instantaneous problem with the pump. However, this is a design limit that Curtiss-Wright has given us for this pump.

They allow us --

MEMBER ARMIJO: Would the heat exchanger just start boiling in there? Would it get too hot that it won't cool the pump?

MR. STELLA: You would approach closer to the pump operating limit for the maximum cooling water temperature in the pump internal cooling system that circulates through the heat exchanger that is cooled by CCS.

And a transient in the system could possibly get you to the point where you would either trigger the high temperature alarm or in rare cases you would get the high-temperature trip of the pump. And when that happens, it also trips the reactor.

MEMBER ARMIJO: Yes, you don't want to do that.

MR. STELLA: So, we have to protect those reactor coolant pumps, so that the limit is there for investment protection, basically.

MEMBER ARMIJO: Thank you.

CHAIRMAN RAY: Anything else?

(No response.)

All right. Thank you.

MR. SEBROSKY: Yes, we have a couple other presentations.

CHAIRMAN RAY: Okay.

MR. SEBROSKY: We need to go through a summary of the 5, 6, and 9.

This slide, slide 15, is meant to provide the ACRS with an overview of the additional determinations that the staff has to make in order to grant the exemption.

The first bullet, if you go to 10 CFR Part 52, Appendix D, and where Rev. 18 will eventually be codified, if the Commission agrees to it, there is a Section IV.A.2.d that says that the applicant must demonstrate compliance with the site parameters. In this case, they do not. As discussed, the DCD Rev. 18 value is 86.1 degrees Fahrenheit, and you have a 1.2-degree different at Summer.

So, in the process, what that takes you to is there is a requirement in Section VIII.A.4 on four of the determinations that the staff needs to make in order to grant the exemption. The second and third sub-bullet, most of the Committee I am sure are aware of it, there are steps in this process that eventually get you back to 50.12.

So, you have to make the determinations that the requirements in 50.12 have been met and the special circumstances that the staff determine were met is that it is not needed to meet the underlying purpose of the rule. The applicant has demonstrated that the underlying purpose of the rule is that the AP1000 unit can operate safely at that high temperature. The staff believes or the staff has found that that underlying purpose has been met.

The first and fourth sub-bullets are unique to the AP1000 or unique to certified designs and, essentially, gets to deviating from a standard design. If you look at the four sub-bullets, special circumstances outweigh any decrease in safety that may result from the reduction in standardization.

The staff found that, as was discussed, there is no change to the standard design as a result of this higher temperature. So, therefore, we made the determination that the first and fourth requirements are met.

So, those are the determinations that the staff documented in Section 9.2.2 of the Safety Evaluation.

CHAIRMAN RAY: Is this the same set of determinations that is done if you have an exceedance of the site seismic envelope, but you go and show that in the plant it doesn't --

MR. SEBROSKY: I would have to take a look at the specifics of that.

CHAIRMAN RAY: Well, I think we had that discussion in the case of Vogtle, didn't we?

MR. SEBROSKY: I would have to talk with Ravi. It gets to whether or not it is codified in what we call Tier 1 of the application. If it is a Tier 1 requirement in the DCD, it essentially requires these four things. So, with the specifics, Mr. Ray, I would have to go back and make sure that that envelope that you're talking about was a Tier 1.

CHAIRMAN RAY: But could I get an answer on that tomorrow?

MR. SEBROSKY: Yes.

CHAIRMAN RAY: Because, you know, we had the discussion about the part of the spectrum. There's a --

MR. SEBROSKY: An exceedance.

CHAIRMAN RAY: Yes.

MR. SEBROSKY: Yes.

CHAIRMAN RAY: And I just don't remember us addressing these points.

MR. CUMMINS: This is Ed Cummins.

In the case of seismic, the way we wrote the DCD is, if the site spectra is not bounded, then you have an opportunity to compare the spectra at four different integral building points.

CHAIRMAN RAY: Yes.

MR. CUMMINS: And if you're bounded in those four critical building points, you're done.

CHAIRMAN RAY: So, it's a built-in way of dealing with an exceedance?

MR. CUMMINS: Yes. It might not deal with all exceedances, but it will deal with tiny ones.

CHAIRMAN RAY: Yes. All right. Maybe that answers the question then, Joe.

MR. SEBROSKY: You think it does?

CHAIRMAN RAY: Uh-hum.

MR. SEBROSKY: We are done with the wet bulb, but we would still like to go through 5, 6, and 9 --

CHAIRMAN RAY: Okay.

MR. SEBROSKY: -- to talk about those, the site-specific evaluations.

Chapter 5, it is all incorporated by reference in the standard information with the exception, as Amy Monroe mentioned, of departure on the maximum safety wet bulb.

Don, do you want to cover Chapter 6?

MR. HABIB: For Chapter 6, there were only two items. One was the wet bulb, which affected the containment system analysis and the control room habitability analysis. And the other item had to do with the item we covered this morning, the concentrations of chemicals from a release for control room habitability.

CHAIRMAN RAY: Oh, gee, let's have that discussion again.

(Laughter.)

MR. HABIB: Thank you.

MR. SEBROSKY: Actually, Chapter 9, as the Subcommittee is aware, is a big chapter, and there is an awful lot of site-specific information in it. But there's very little that we think rises to the level of ACRS attention.

If you go to slide 18, Don, on the slides, slide 18, the highlighted sections have a discussion of the departures, specifically 9.1.3 and 9.2.2 that we talked about.

We did not think that we needed to provide a presentation on the service water system. We do have people here to answer any questions you might have.

If you go to the next slide, just going through these sections, again, we highlighted the section that has the departure in it.

The raw water system on this slide 19 is highlighted. Amy Monroe provided a discussion of that, and we have some slides at the end of this that give our perspective on the raw water system.

If you go to slide 20, you see it is essentially all standard in IBR with the exception of the nuclear island nonradioactive ventilation system. There is some additional information that is provided on that system.

If you go to the next slide, again, this is just a highlight of all the other sections. We don't have any prepared presentations on any of the site-specific information in it.

If you go to the next slide, I would like to turn it over to Larry Wheeler to discuss the raw water.

MR. WHEELER: Yes, the raw water is non-safety and it is not-RTNSS. Raw water intake structure includes three non-safety pumps which pump some filtered water from the Monticello Reservoir to the circ water cooling towers, and it's alternate supply to the service water cooling towers by a crosstie.

A nearby offsite water treatment facility provides filtered water to the demineralizer water treatment system, the fire protection, the normal service water cooling towers, and, then, other miscellaneous users.

Availability controls, 2.4, exist for the service water system for Modes 5 and 6. That is from the AP1000 DCD.

Next slide.

Raw water shared systems for Unit 2 and 3, which includes the offsite water treatment, which is about 1,000 gpm water supply. It's a 400,000-acre-feet reservoir. This is adequate to support the seven-day shutdown operations.

It also consists of three 50 percent capacity raw water pumps to support circ water and, also, alternate for service water.

Two hundred percent capacity screen wash pumps. Two of the three raw water pumps and discharge valves are diesel-backed. Traveling screens and screen wash pumps are also diesel-backed. HDPE underground piping is being planned to be used at this site.

Next slide.

Raw water has redundancy with the raw water pumps to support cold shutdown. Reliable materials are being utilized consistent with industry good practices. Raw water is nonradioactive. Contamination is not credible.

Next slide.

The staff review summary is GDC 2 and 4 have been satisfied. Staff concludes their raw water system meets all applicable regulations. It is considered highly reliable to support cold shutdown.

That is the end of my presentation.

CHAIRMAN RAY: I was just trying to see if I understood. Where do the liquid discharges go to from the plant?

MR. WHEELER: You would have to ask the applicant that question.

CHAIRMAN RAY: Where do the liquid waste discharges go to? The processed stuff, where does it go?

MR. SCHMIDT: Yes, this is Tim Schmidt, SCE&G.

The wastes go to a wastewater system that discharges to the Parr Reservoir.

CHAIRMAN RAY: Say it again, the last part?

MR. SCHMIDT: The wastes go to a wastewater system that discharges to the Parr Reservoir.

CHAIRMAN RAY: Okay. So, you're discharging to the reservoir the processed, I understand, but I was just listening to the business about its not being credible that there was radioactive contamination of that raw water system. Not being credible is a strong statement.

MR. SCHMIDT: Yes, this is Tim Schmidt again.

I thought we were talking about -- I was mistaken. The discharge, the wastes go to -- we're talking about --

CHAIRMAN RAY: I assume it goes to the river, doesn't it?

MR. LaBORDE: This is Jamie LaBorde.

Are you asking about the ties of the system to understand how or why we don't have a potential for contamination?

CHAIRMAN RAY: Is there no liquid release of processed water from this site at all?

MR. LaBORDE: Yes, we have a release, but it doesn't --

CHAIRMAN RAY: Where does it go?

MR. LaBORDE: It goes into the cooling tower blowdown, which, then, goes down to Parr Reservoir. So, we release, basically, into the blowdown line, although we go through a reservoir first.

CHAIRMAN RAY: So, if, hypothetically, there was any contamination in that released, it would go to the reservoir, which is where the raw water system comes from, doesn't it?

MR. LaBORDE: No, raw water is coming from Monticello.

CHAIRMAN RAY: Okay. Yes. All right. I got the two mixed up. To me, the river is that reservoir that you are referring to.

MR. LaBORDE: The Parr Reservoir is on the river.

CHAIRMAN RAY: That's right. That's right. So, ultimately, it goes out the river to the ocean?

MEMBER RYAN: After a while.

CHAIRMAN RAY: Yes.

(Laughter.)

I mean there's no Dead Sea in South Carolina. It goes to the ocean.

So, I can now agree with the idea that the raw water system has no credible source of contamination. But that was the problem I was having.

MEMBER BANERJEE: But that is drawing from Monticello Reservoir, right?

CHAIRMAN RAY: That's right, not the one that he is talking about, which, to me, it's the river. It's just a reservoir in that --

DR. HINZE: To a wide place in the river.

CHAIRMAN RAY: A wide place in the river, yes, but it's the river.

(Laughter.)

MEMBER BANERJEE: Where does Unit 1 discharge to, to Monticello or to the Parr Reservoir?

MR. LaBORDE: Unit 1 also discharges into Parr Reservoir. It discharges, technically, it discharges into the penstocks at Fairfield pump storage, and it is allowed to discharge only when we are in the generate mode and greater than, I believe it is 40 percent power on the unit, that it is going into its penstock.

CHAIRMAN RAY: All right. All that makes sense now. Thank you.

Now anything else?

(No response.)

Okay. All right. So, now it's quarter to 4:00, but we're going to try to finish today's agenda, if it doesn't take us too long here to do that.

So, I believe we have now Chapters 3 and 9.

MEMBER RYAN: Three and 19.

CHAIRMAN RAY: Nineteen. Thank you, Mike.

I'm getting a little foggy, I guess, but I have been looking forward to this PRA discussion. I have been looking forward to listening to it, not engaging in it.

MS. MONROE: At this point, we would like to discuss both Chapters 3 and 19. There's a little bit of overlap there, so we wanted to cover them at the same time.

In Chapter 3, we were discussing the design of structures, components, equipment, and systems. Again, we incorporated the DCD by reference, and all the standard material was incorporated.

There are some site-specific supplements in the following sections, and we wanted to touch briefly on those.

And 3.3 discusses the wind and tornado loading designs. And as we confirmed in our analysis in Section 2.3, all the site parameters are bounded and meet the DCD interface requirements.

For flooding, that is the Case 2, as discussed in Section 2.4 this morning. We meet the design requirements of the DCD.

For turbine --

MEMBER BLEY: Just to jump ahead a little, those interface requirements are the place you look to see, also, if your PRA is adequate in those areas, if their PRA is adequate for this stage?

MS. MONROE: Yes.

MEMBER BLEY: Okay.

MS. MONROE: For the turbine buildings, we meet the DCD multi-unit siting requirements both by distance and by the spacing. We also looked at Unit 1, and it has been evaluated and determined not to have an impact on the Units 2 and 3.

For seismic design, and here's where I'm going to read because I'll confuse myself in a heartbeat and I'll always get the acronyms wrong, but SCE&G has provided a comparison of the site-specific ground motion response spectra, or GMRS, to the AP1000 hardrock high-frequency, HRHF, spectra and the certified seismic design response spectra, or the CSDRS.

And while the site-specific horizontal and vertical GMRS does exceed the standard AP1000 CSDRS, at high frequencies it is completely bounded by the AP1000 HRHF spectrum. And it is, therefore, considered to be acceptable.

For waterproofing material, we are

utilizing the sheet-type material, as discussed in the DCD, as one of the options for acceptable waterproofing design.

In Chapter 19, we again incorporated the DCD by reference and all standard material. There was a site-specific external events evaluation that was performed. It addressed winds, floods, transportation, and nearby facility accidents and fires.

The high wind evaluation included tornadoes, hurricanes and extratropical cyclone sources. The frequency for both the tornadoes and hurricanes was calculated and determined to be bounded by the AP1000 DCD. For extratropical cyclones, the frequency was calculated and determined to be slightly higher than that assumed in the DCD. But because the plant is actually designed for wind speed much greater than we would expect to see in cyclones in this area, the risk was determined to be negligible and, therefore, acceptable.

Floods, again, the Chapter 2 evaluation showed that the flooding is not considered to be a likely risk due to the plant siting.

Transportation accidents, including aviation, marine, railway, and truck, and the nearby facility accidents, including the pipeline that runs down by the Broad River, were evaluated in Chapter 2 and determined either not to be applicable or that the frequency or risk was bounded by the DCD.

Fires, it was determined that the distance between the fire source and the plant --

MEMBER BANERJEE: How far is the pipeline? Remind me.

MS. MONROE: It runs down by the Broad River.

MEMBER BANERJEE: By the railway line?

MS. MONROE: Right. By the railway line, correct.

MEMBER BANERJEE: It's a natural gas pipeline?

MS. MONROE: Correct.

MEMBER BANERJEE: And Bechtel did some analysis of this? Yes, right.

MS. MONROE: Correct.

MEMBER BANERJEE: Okay. I read the analysis, but what was the conclusion, that the pressure wave was much lower, right, than 1 psi?

MS. MONROE: Let me fall back on my Bechtel friends.

MEMBER BANERJEE: So, this 4200 feet is

what you're appealing to there?

MR. PATTON: This is Dan Patton from Bechtel.

Yes, the conclusion was that the pressure wave at the near safety-related system structure component was much less than 1 psi.

MEMBER BANERJEE: And you took only the natural gas to the first shutoff valve, right, in this?

MR. PATTON: Yes, that's correct.

MEMBER BANERJEE: So, you assumed that if there was a break or a leak, that the thing would shut off?

MR. PATTON: There were a couple of assumptions made. One was that the amount of gas that would be released over a 10-minute period was allowed to form a cloud, and that was transported and exploded, the vapor cloud explosion.

MEMBER BANERJEE: And the amount, you chose 10 minutes because your isolation valves would close, right?

MR. PATTON: That's correct.

MEMBER BLEY: So, do they close automatically?

MEMBER BANERJEE: Yes, the block valves.

They're supposed to if they can detect the leak, yes. Sometimes they can't.

CHAIRMAN RAY: It would be a break, actually, I assume, that would generate --

MEMBER BANERJEE: Well, they assume critical flow, I think, and it's a double-ended guillotine.

There was quite a margin or what was it? Can you remind us?

CHAIRMAN RAY: Where did he go?

MEMBER BANERJEE: They are looking at that.

MS. MONROE: He's checking.

MEMBER BLEY: And while you are looking, it was not treated probabilistically. It was just assumed that it would isolate in 10 minutes?

MEMBER BANERJEE: Yes. It was just a break, yes, 10 minutes.

CHAIRMAN RAY: In a list of external events, I would ordinarily expect to see seismic. It is not listed there because why?

MEMBER ARMIJO: It's in 1955.

CHAIRMAN RAY: Wrong section, huh? Okay.

MEMBER BANERJEE: If we get the answer later, you can carry on.

MEMBER BLEY: Well, while we're waiting for this -- I'm sorry -- but you don't have a briefing on 19 --

MR. SEBROSKY: Staff does.

MEMBER BLEY: Okay, but you don't?

MS. MONROE: I don't, correct.

MEMBER BLEY: But you didn't seismic because?

MS. MONROE: I knew it was already going to be addressed by the staff, and we didn't want to say the same things.

The only other item on this, while we are waiting to hear back on the pipeline information, was dealing with fires. It was determined that the distance between the fire source and the plant allowed for us to draw the conclusion that the fire did not pose a hazard due to the hazard?

MEMBER BANERJEE: What was the fire source?

MS. MONROE: The fire source would be considered like a forest fire.

MEMBER BANERJEE: Oh, okay.

CHAIRMAN RAY: All right. Anything else, Amy?

MEMBER BANERJEE: The hazard, what is the regulation? Is there anything on heat radiation and things like that from a fire source? I mean it's like this 1 psi thing with the pressure wave? Is there something like that?

MS. MONROE: I do not know the answer to that. I would have to check.

MEMBER BANERJEE: So, I am just wondering how the fire poses a hazard. By radiation? Somebody should know that, right?

CHAIRMAN RAY: Well, you know, one way would be if you had a safety-related offsite ultimate heat sink, not offsite, but an ultimate heat sink source, water source, that would be affected by a fire.

MEMBER BANERJEE: I am just wondering how they determined that a fire is not --

CHAIRMAN RAY: Okay. I thought you were asking, how could it be a hazard anywhere? It would be hard, but it would have to be something that was, I would think, at a greater distance from the plant itself.

MEMBER BANERJEE: But is there a regulation?

CHAIRMAN RAY: Not that I know of.

MEMBER BANERJEE: If this is this, then

it's okay.

CHAIRMAN RAY: Yes.

MEMBER BANERJEE: If it's not, it's not okay.

CHAIRMAN RAY: It's a heck of a threat to the offsite power source, but, of course, that's not what we're talking about here. Offsite power is often lost due to fires, I mean relatively often.

MEMBER BLEY: Usually, from the lightning that starts the fire.

CHAIRMAN RAY: No, not in California, it's not.

MEMBER RYAN: In South Carolina it could be lightning.

CHAIRMAN RAY: It could be lightning, sure, but whatever causes it, if the fire burns near the plant, you lose offsite power.

MEMBER BANERJEE: So, who did this fire analysis, I mean, evaluated the fire? I mean with winds, floods, the other accidents, we have some --

CHAIRMAN RAY: I think we may have an answer here first before we answer.

MS. RICHMOND: Right.

MEMBER BANERJEE: Oh, okay.

MS. RICHMOND: We did two different

scenarios for it. The first one was released 10 minutes, and, basically, really conservatively, we didn't disperse that over 10 minutes. It released over a million pounds and we counted it as 2.7 million pounds of TNT and blew it right there. And we still had over 700 feet of safe distance left.

And the second one, what we did was release this over time and travel the cloud. This one we had a distance to the lower flammable limit. And after that, you know, it wouldn't catch fire. That was 511 meters or 1677 feet. So, there was over 3,000 feet safe separation for any kind of fire.

MEMBER BANERJEE: So, you released this amount between the block valves, the all natural gas between the block valves?

MS. RICHMOND: Basically, the way it was done is we assumed -- we didn't assume the valve shutoff. We assumed that was the source just rushing out over the time period.

MEMBER BANERJEE: So, why did you choose --

MS. RICHMOND: We didn't even consider that conservatively. We just let a huge mass of the natural gas come out.

MEMBER BANERJEE: So, how much was that

compared to the mass between the block valves?

MS. RICHMOND: We didn't do the calculation of the actual mass between the valves. I can tell you it was significant. It was --

MEMBER BLEY: The only problem with this for me is --

MS. RICHMOND: -- a million pounds.

MEMBER BLEY: -- if the valves work like they ought to, this is way too much.

MS. RICHMOND: Right.

MEMBER BLEY: And if they don't work like they ought to, I don't know why they close in 10 minutes. So, you could have an awful lot more.

(Laughter.)

So, you're in between here.

MEMBER BANERJEE: I don't know. I mean these valves are put a fair distance apart.

MS. RICHMOND: 1.33 miles is the distance from the breakpoint to the valve, is 1.33 miles.

MEMBER BANERJEE: Yes, the upstream valve. What about the downstream valve?

MS. RICHMOND: Where we took the break at was end the pipeline because that was at the Parr combustion turbine. So, it doesn't keep on going. You have only got one source feeding into it.

MEMBER BANERJEE: Oh, it is just coming --

MS. RICHMOND: Right, it is not a continual pipeline.

MEMBER BANERJEE: Okay. So, it is 1.3 miles in --

MS. RICHMOND: To that one.

MEMBER BANERJEE: So, that's what, 12-inch pipe or something?

MS. RICHMOND: Twelve-inch, right.

MEMBER BANERJEE: Well, we will work it out.

MS. RICHMOND: Right.

MEMBER BANERJEE: What's the pressure?

MS. RICHMOND: I believe it's 700 psi.

MEMBER BANERJEE: Okay, 700 psi, 1.3 miles, 12-inch pipe, and you released how many pounds?

MS. RICHMOND: 1.2 million pounds.

MEMBER BANERJEE: 1.2 million pounds.

CHAIRMAN RAY: You need to have the line diameter, don't you?

MEMBER BANERJEE: Yes, it's 12-inch. Yes, it's fine.

MEMBER BLEY: So, you're talking 7,000 cubic feet or so. That's a lot more than --

MS. RICHMOND: Right.

MEMBER BANERJEE: Yes. Okay. I think that tells us.

MS. RICHMOND: Right. And we didn't even travel that. As it is coming out, and it was right here, and we blew off that.

MEMBER BANERJEE: I mean, what was, if you broke it, what was the temperature it got to? Presumably, it goes into critical flow, right?

MS. RICHMOND: Uh-hum.

MEMBER BANERJEE: So, it's about a sound speed of, what, 350 meters per second or something, roughly?

MS. RICHMOND: Yes.

MEMBER BANERJEE: I can do it on the back of an envelope, I think. It has to be that, roughly. How much was the velocity that you got? So, it will be critical flow.

MS. RICHMOND: Right.

MEMBER BANERJEE: So, the speed of sound is roughly 300 to 400 meters per second, somewhere there.

The only thing, I'm looking for the temperature of the release.

MS. RICHMOND: Okay. Let me see, the temperature?

MEMBER BANERJEE: Because it expands and cools off.

MEMBER BLEY: It must build up a pretty good static charge rushing out there.

MEMBER BANERJEE: Well, the density will be higher than air, right?

MS. RICHMOND: Right.

MEMBER BANERJEE: It will be like a couple of kilograms per meter cubed, I would imagine, even though natural gas is light. So, I'm just trying to figure out whether it will form a cloud or stay near there.

What you did is you basically just burnt it all? Did it all go or?

MS. RICHMOND: Right.

MEMBER BANERJEE: It all went? So, there was no issue between UFL, AFL?

MS. RICHMOND: For one of the cases, all of it went. We just assumed all of it went, conservatively.

MEMBER BANERJEE: Okay. Yes. I think, if you assume that, all this doesn't matter.

MS. RICHMOND: Right. It was very conservative, the way it was done.

MEMBER BANERJEE: Okay. Fair enough.

MEMBER BLEY: Given that the valves actually close, it was very conservative.

MEMBER BANERJEE: Yes, the valves.

Is there one block valve only or is there a block valve --

MS. RICHMOND: That I don't know. I know that the end was the Parr combustion turbines, and, then, there was one 1.3 miles, and I'm not sure of the spacing thereafter for the block valves, the next one.

MEMBER BANERJEE: Okay.

MS. RICHMOND: I'm not sure what distance that would be.

MEMBER BANERJEE: 1.2 million pounds.

MS. RICHMOND: Exactly.

MEMBER BANERJEE: Okay. Thanks.

CHAIRMAN RAY: Now where we in this? We were about to do something more when I interrupted.

MS. MONROE: We were talking about the fire hazards.

CHAIRMAN RAY: That's right, the heating threat.

MS. MONROE: And I needed to go back and look through the FSAR and get back and provide Mr. Banerjee an answer.

MEMBER BANERJEE: Yes, I don't think it

was an issue. I just wanted to know what was the criteria for saying it's okay.

MS. MONROE: What was the specific criteria, I will double-check and get you that criteria.

MEMBER BANERJEE: Okay.

CHAIRMAN RAY: Yes, one might imagine that the issue of heat load on the plant from an approaching forest fire was not addressed on the basis that it wouldn't be a threat. But who knows? We will see.

MEMBER BANERJEE: Well, this site is surrounded by water. It's not like California where the fires come --

CHAIRMAN RAY: I agree. I doubt very much that I would see that as a possibility, but you asked the question.

MEMBER BANERJEE: Yes. Yes, I just want to know.

MEMBER RYAN: There is a lot of pine forests. It really depends on what the clearing looks like local to the plant,

CHAIRMAN RAY: Yes. The heat is not insignificant, but it is not anything like --

MEMBER BANERJEE: You should have gone and looked at the site and seen where there could have been a forest fire.

CHAIRMAN RAY: All right.

MEMBER RYAN: I can get there in a half-hour.

(Laughter.)

CHAIRMAN RAY: Thank you.

Are we finished with your part, Amy?

MS. MONROE: I'm concluded now, yes.

CHAIRMAN RAY: I don't know. It sort of got into a desultory process here. Let's move on, shall we, then, to the staff?

MR. GALLETTA: All right, for the staff's presentation on Chapter 3 and Chapter 19, PRA, my name is Tom Galletta. I'm with AP1000 Branch.

Also in the room, we have Terri Spicher. Terri had Chapter 3, PM for Chapter 3. And I was PM for Chapter 19, PRA.

To my right, we have Bret Tegeler and Vaughn Thomas for Chapter 3 and Malcolm Patterson, tech staff, for Chapter 19, PRA.

The items that we feel rise to the level of attention for ACRS, one for each chapter highlighted in yellow here under seismic design and one in Chapter 19 on external events.

And at this point, I will turn it over to Vaughn for the Chapter 3.

MR. THOMAS: Good afternoon.

My name is Vaughn Thomas. To my right is Bret Tegeler. We both reviewed VC Summer FSAR.

CHAIRMAN RAY: We have to be able to pick this up on the microphone. So, if you would raise your voice just a little higher, please?

MR. THOMAS: Yes. Good afternoon.

My name is Vaughn Thomas from NRODE. To my right is Bret Tegeler. We both reviewed VC Summer application.

And there were two issues that, because it is a hard rock site, we wanted to make sure that we see a comparison of the site-specific GRMS compared to the HRHF and the certified seismic design response spectra, and to make sure to determine whether there were exceedances.

And we can see that the applicant provided us a comparison of the site-specific ground motion response spectra compared to the hardrock high-frequency spectra and the certified design response spectra. And in reviewing that FSAR and that comparison, we identified that there were exceedances in both the horizontal and the vertical range.

However, you saw that it is entirely bounded by the AP1000 hardrock high-frequency spectra. And as a result, the staff concluded the high-frequency seismic input was evaluated in the AP1000 DCD and considered to be non-damaging.

Next slide.

DR. HINZE: What would a narrower error envelope look like on that?

MR. TEGELER: On which? I'm sorry, which spectra?

DR. HINZE: On your results.

MR. TEGELER: Well, Summer didn't perform site-specific analysis. So, we don't have results of site-specific, an evaluation for the six key locations for the nuclear island.

What you are seeing on this plot is a comparison of the -- you were talking about the error in the site calculations?

DR. HINZE: They hit the hardrock. So, they didn't have to go to the six alternative sites, right?

MR. TEGELER: Correct.

DR. HINZE: So, you didn't have to do that, right?

MR. TEGELER: They were essentially

bounded by the Westinghouse --

DR. HINZE: Right, right. But what would the Summer -- could you put an error envelope on the Summer GMRS?

MR. TEGELER: I'm sure there is. Our Branch does not review the development of the site. I wonder if Yong Li -- that's a Chapter 2 issue. So, I am wondering, we do have some Chapter 2 support here.

Yong, can you perhaps comment?

MR. LI: What's the question. I'm sorry. Could you repeat the question?

DR. HINZE: Yes. The question is, what does an error envelope look like on the Summer GMRS?

MR. LI: Error?

DR. HINZE: Error envelope. You know, is this a perfect GMRS?

MR. LI: Yes, it is a site-specific GMRS for the hardrock site at the Summer site.

Sorry. I am Yong Li. I'm a seismologist at RGS2.

DR. HINZE: So, there's no error envelope?

MR. LI: Error? All the answers to be incorporated, yes, the GMRS has all, you know, it is starting from the seismic hazard analysis. We cite the uncertainty. Everything has been incorporated.

DR. HINZE: So, there is no range of error in the results that you lead to to get to the GMRS?

MR. LI: The error?

DR. HINZE: The reason I'm asking the question is these are very close.

MR. LI: Oh, very close, uh-hum.

DR. HINZE: Yes. And so, if there was any error envelope in the GMRS for Summer, then you could exceed this in the high-frequency area, right?

MR. LI: Now I see your point. Sorry. Yes, I think you are talking about, could it have been marginally exceeded?

DR. HINZE: Yes.

MR. LI: Yes. But I think that is the GMRS you got for this particular site, everything incorporated, with all the kinds of uncertainty.

MEMBER RYAN: But incorporating uncertainty isn't producing an error on that curve. What I think Professor Hinze is asking, somewhere around 50 hertz, is the black line different than the blue line statistically? Yes or no?

I mean what you have included is fine, but, you know, are they statistically-different curves or are the error bars such that that's the same answer?

MR. WHORTON: This is Bob Whorton with

SCE&G.

It might be helpful just to briefly understand development of the HRHF by Westinghouse. As the initial applications were being developed for Bellefonte, Lee, and Summer, which were all hardrock sites, when we developed the individual site-specific GMRS, so the one in the dashed line you are looking at is the site-specific Summer GMRS, Bellefonte and Lee had very similar-looking curves, maybe a little higher, maybe a little lower.

Because in each case at high frequency there were exceedances of the initial CSDRS, the certified design, Westinghouse decided at that point that, if we could envelope all of the current application sites with a spectra, which was then called the HRHF spectra, then the analysis would be performed by Westinghouse to ensure that that was a non-damaging or it could be --

DR. HINZE: SSCs, right?

MR. WHORTON: -- yes -- that it could be accommodated by the AP1000 design.

So, what you are looking at, granted, at about less than 10 hertz, the dashed line and the solid line are very close together. So, Summer would dominate in that region; whereas, the 25-hertz range, there's a bigger difference and more than likely that was the Bellefonte-type curve.

Now all three curves were also bumped by about 2 percent, if I recall correctly. So, the HRHF was a combination of all the then-current applications.

DR. HINZE: There was no seismic margin of 1.67 or --

MR. WHORTON: No. Right.

DR. HINZE: Okay.

MEMBER RYAN: That's helpful. Thank you.

DR. HINZE: Thank you.

MR. PATTERSON: I'm here to talk about the other external events, the ones in Chapter 19.58.

CHAIRMAN RAY: Could you introduce yourself?

MR. PATTERSON: I'm sorry. Malcolm Patterson of the PRA staff.

We looked at the site-specific characteristics that the applicant reported, and we agreed, for various reasons, that all of the external events made negligible contributions to risk.

First, if the DCD analysis bounded for the site, that was an acceptable way of saying it's not going to add anything to risk. If the frequency of the external event was negligible, in the case of Summer, there were no aviation -- the probability of an aviation-related accident was well below our screening criteria of 10 to the minus 7. And in other cases, the consequence of the external event is not going to increase risk that could be screened out for that reason.

We agreed that the flooding at this particular site was not an issue. The grade is about 150 feet above the flood plain.

We agreed that the extratropical cyclones, although their frequency was slightly higher than the DCD had assumed, their consequences are negligible. The plant was designed to deal with them.

And the railroad and truck, the truck accident that was used involved the explosion of a truck that was already on the site. So, that was clearly bounding.

And we don't yet have incorporated in the FSAR the frequent and nearby facilities and external fires, but we have received input telling us what is going to be in the next revision of the FSAR. So, it is just a confirmatory item.

But, in the case of external fires, I can tell you how the staff approached it. The argument from the applicant was basically qualitative, standoff distance, how much was cleared from the safety-related structures to the nearest source. And having no expertise, PRA staff turned to the fire protection group and asked them whether this was a reasonable argument, and they said yes.

MEMBER BANERJEE: It was quite a long way to the trees, or whatever. What, a mile?

MR. PATTERSON: I'm sorry, I have no recollection.

MEMBER BANERJEE: I have seen so many houses burnt in my locality.

MEMBER BLEY: These trees are wet.

MEMBER BANERJEE: These are wet trees.

(Laughter.)

MR. SEBROSKY: Mr. Ray, that is all we have for Chapter 19. If you don't have any questions, we can move on to the Chapters 8 and 10 presentation.

CHAIRMAN RAY: Yes, I think so, Joe. I mean we can also put that over until tomorrow, but there is no need for us to do that, and I assume it would be inconvenient for others.

MR. SEBROSKY: We have the technical staff here.

CHAIRMAN RAY: Okay.

MEMBER BANERJEE: This is moving along like a forest fire.

CHAIRMAN RAY: No, just trying to at least stay with the schedule. We will have a brief discussion and call it a day here.

MS. MONROE: Have you all been handed slides for this, for Chapters 8 and 10? Have you all got the slides for 8 and 10?

CHAIRMAN RAY: Yes.

MS. MONROE: Yes? Okay.

Prior to going there, if you don't mind, Dan Patton can give us a little more information. We did do an evaluation on heat flux for the fires, and let him talk and see if that will better answer our question.

MR. PATTON: Basically, in this analysis, we followed the methodology outlined in NUREG-1805, looked at the site, and determined the closest point of approach of any wildfire. It looked like the closest point of approach was from the west, a little over a thousand feet away. And the heat flux on the nearest safety-related systems structure or component would be approximately 1.3 kilowatts per meter squared.

And the heat flux from the sun is

approximately 1.4.

MEMBER BANERJEE: So, how close did the fire get? A thousand acres --

MR. PATTON: A little over 1,000 feet away.

MEMBER BANERJEE: A thousand feet?

MR. PATTON: Is the closest treeline.

MEMBER BANERJEE: Okay. So, that's quite a bit closer than your railway lines and things?

MR. PATTON: Yes, it is.

MEMBER BANERJEE: And between these and all the structures, there's nothing inflammable?

MS. MONROE: Correct.

MEMBER BANERJEE: No buildings, nothing that can catch fire?

MR. PATTON: No.

MEMBER BLEY: Did you look at any effects that you might have from really heavy smoke coming down from a pine forest fire?

MR. PATTON: The smoke effects would be more on the control room, and there are smoke detectors in the control room HVAC system to close that off.

MEMBER BLEY: Close it off? Maybe on the switchyard, but that would only get you in a situation involving --

MEMBER BANERJEE: What is the forest? Is it pine or what?

MEMBER BLEY: Everything down that way is pine.

(Laughter.)

MR. LaBORDE: In Unit 1, they said 85 percent of the land usage was in pulp and paper timber.

MEMBER REMPE: What was the NUREG again you said you followed to do the analysis?

MR. PATTON: 1805.

MEMBER REMPE: 1805?

MEMBER BANERJEE: Okay. Sounds good.

MEMBER BLEY: But before you get into Chapter 8, I was just looking. Somebody earlier had raised a departure or something dealing with the electric power system and I don't see it in these slides. Does that ring a bell?

MS. MONROE: The reason being that it is a standard departure. So, it was already addressed --

MEMBER BLEY: Oh, it was already in there? Okay.

MS. MONROE: Correct.

MEMBER BLEY: Okay. Thanks.

CHAIRMAN RAY: All right.

MS. MONROE: Okay? Now we will move along and address both Chapters 8 and 10.

Mr. Jamie LaBorde from SCE&G will address Chapter 8 for us.

MR. LaBORDE: I'm Jamie LaBorde.

We are a standard plant. We have site-specific portions of our application in Chapter 8 that include the switchyard and our site-specific utility agreements and procedures.

We have completed our stability study, evaluating the specific conditions, and meet the Westinghouse interface requirements for DCD Chapter 15.

The new plant has 12 transmission lines tying into a new 230-kV switchyard for Unit 2/3. We also have connections for three ties to Unit 1 switchyard, two ties for the reserve aux transformer for Unit 2 and Unit 3, and those connections are all made in a breaker-and-a-half configuration. We also have the stepup transformers or GSUs connected in a double-bus, double-breaker configuration. We believe the switchyard is a very robust design.

The lines that come into the switchyard, any individual line can carry all the power we need for both units simultaneously in abnormal or normal or accident-type conditions. We do have an ITAAC that is in 2.6.12-1 that confirms the as-built condition of the switchyard. And I believe the ITAAC is the same as Vogtle's.

MEMBER BANERJEE: What's the voltage of these lines?

MR. LaBORDE: 230 kV. All of the connections on Unit 2 and 3 are 230 kV.

MEMBER BANERJEE: Oh, all 230 kV?

MR. LaBORDE: Yes.

We have done a failure analysis on the switchyard and with acceptable results. We did our grid stability studies to comply with the North American Electric Reliability Corporation, or NERC; the AP1000 interface requirements, which include the requirement to maintain voltage on the reactor coolant pumps for 3 seconds following a turbine trip condition, and Reg. Guide 1.206. A grid stability study is also required by ITAAC.

CHAIRMAN RAY: One question here. I understand this point about the turbine trip, but what happens if you lose offsite power with the plant on the line? Is that not a credible event? Because in that case, of course, you couldn't meet this criteria.

MR. LaBORDE: The unit can run back.

CHAIRMAN RAY: Huh?

MR. LaBORDE: The unit can run back. That's contained in the standard plant information.

CHAIRMAN RAY: Oh, okay.

MR. LaBORDE: But it can run back and maintain --

CHAIRMAN RAY: Sure. All right. I see.

MR. LaBORDE: The normal setup, the generator powers the plant. The reserve aux transformers are energized, but are not really powering loads.

CHAIRMAN RAY: Yes. Okay.

MR. LaBORDE: And that is part of the standard part. We are the same.

CHAIRMAN RAY: All right. But the run-back issue rather than tripping, lost of offsite power, is what I was thinking about.

MR. LaBORDE: Yes. Okay.

This is a general layout of the site. If you look to the left, you can see the switchyard for Units 1 and 2; up in the top right, the switchyard for Unit 1; the two units, Unit 2 and 3 in the bottom center.

All the lines that are going to the west go out of the Unit 2 switchyard along with some other lines going to the south and one line going up to the north. The lines coming out of Unit 1 go to the east and south and one line to the north. There are three ties between the two switchyard. All these are done at 230,000 volts.

When we finish the plant, we will decommission an existing substation at Parr, an existing 230-kV switchyard at Parr.

MEMBER BANERJEE: Where is that, on that side?

MR. LaBORDE: It is below --

MEMBER BANERJEE: Okay.

MR. LaBORDE: -- down at the old Parr facility, near where that gasline is.

MEMBER BANERJEE: That line is, okay.

(Laughter.)

MR. LaBORDE: It is about, I'm going to say, a mile and a half away. I don't have an exact dimension. But, basically, we are superseding the need for that. So, we are going to retire that switchyard. It also helps us clean up the right-of-ways because that was a problem getting all the lines in. So, we clean up the right-of-ways.

Speaking of right-of-ways, we have

procured or we have over 90 percent of our lines in existing right-of-ways. We have identified the routes and are working toward, in the process that we go through to get the easements for the remaining right-of-ways -- and that is about six miles of right-of-way, and that is for SCE&G.

CHAIRMAN RAY: Do you guys dispatch the grid at this point?

MR. LaBORDE: Yes.

CHAIRMAN RAY: And I assume the IGO facility would give you black-start capability in the grid?

MR. LaBORDE: We have some things we do for Unit 1 with the hydro. I don't want to speak too much for Fairfield right now, whether they can black-start or not. I know at one time we looked at that, but we don't have enough load for them to really black-start.

CHAIRMAN RAY: Yes. All right. That's fine.

MR. LaBORDE: But we do have ties to Unit 1 switchyard from ours.

This is a single line of our switchyard. The generator connections that we made are both -- both generators are connected in double-bus, double-breaker configuration to give us the maximum reliability on the generators. A breaker-and-a-half connection and steam is used for all the other lines connecting to the switchyard.

We have primary and backup protection on all the breakers with separate senors, separate power supplies, and separate breaker trip coils. This basically results in a highly-reliable, maintainable switchyard.

And that's about all I wanted to present, unless there are any questions.

CHAIRMAN RAY: Thank you.

MR. SEBROSKY: Again, my name is Joe Sebrosky. I'm lead Project Manager for Summer.

We are here to present our review of Chapter 8. There were two electrical reviewers involved with this: Tania Martinez Navedo and Om Chopra, who is to my right.

This is a breakdown of the site-specific information that is in various sections of Chapter 8. Anything that is in yellow, highlighted, we are going to make a presentation on. We are not going to make a presentation on the conceptual design information regarding the transformer area, and we do not intend to make a presentation on onsite DC power or the grounding system and lightning protection.

So, with that, I will turn it over to Mr. Chopra.

MR. CHOPRA: Yes. My name is Om Chopra. I'm from Electrical Engineering Branch of New Reactors.

Actually, you finished half of my presentation.

(Laughter.)

That's what I was describe, that the first slide really shows an overview of Summer's COL and supplemental items. And these sections provide information on Summer units' connection to the utility grid, additional information on regulatory guidelines, transmission, system description, and testing and inspection plan, layout of the switchyard, and an FMEA performed on the switchyard and the stability analysis. That, you just heard from the applicant, they have performed on their offsite power system, and the information on transmission system planning and interface requirements.

Next.

The applicant has adequately addressed VCS Supplement 8.1-1. They have already described they have 12 transmission lines that really connect the 230-kV switchyard to the SCE&G transmission network.

The second item --

MEMBER BANERJEE: What is the total generation capability on this network?

MR. CHOPRA: Eleven hundred megawatts.

MEMBER BANERJEE: No, I mean on the SCE&G transmission. I am just trying to get a feel for the relative size of this. You were 2800 megawatts here, right?

MR. LaBORDE: Steve Byrne might be able to tell me. I believe it is around 5400 megawatts, but I am not positive anymore.

MEMBER BANERJEE: So, these two plants are going to be 2800 megawatts added?

MR. CHOPRA: Yes, 1100 each.

MEMBER BANERJEE: Oh, is it 11?

MR. LaBORDE: Well, 11, net each.

MEMBER BANERJEE: Well, 1200 each?

MR. CHOPRA: I think it is 1100 each, all AP1000.

MEMBER BANERJEE: Okay, I'll accept whatever number.

(Laughter.)

MR. LaBORDE: You want a total generation?

MEMBER BANERJEE: Yes. I am just trying to get a feel for what percentage of the transmission network this is, these plants are going to be.

MR. BYRNE: This is Steve Byrne again from SCE&G.

We have about 5800 megawatts on our system. The two new units are going to be about 1117 megawatts net each, of which we get 55 percent of that power.

MR. CHOPRA: The applicant has also adequately addressed Supplemental Information 8.1-2. This is regarding implementation of training and procedures to reestablish offsite power source from the network in the case of a station blackout. And this clarifies the recommendation of 1.5.5.

COL Action Item 8.2-1 has been adequately addressed. It will share 230-kV switchyard. They just described it has about a 10 base, 8 base, has a breaker-and-a-half and two have, I'm sorry, a double-breaker arrangement. And the switchyard is about 2,000 feet from Units 2 and 3.

And to satisfy the confirmatory item 8.2-1, the applicant provided the site-specific voltage and frequency variations expected at the Unit 2 and 3 switchyard during transient and steady-state operating conditions.

And the site-specific, these are the

interface items that AP1000 has listed in their table.

And to satisfy confirmatory 8.2-3, the applicant will include in its FSAR the condition monitoring program of the underground and inaccessible cables and do the maintenance program. These condition monitoring programs will be based on lessons learned from the industry operating experience. It addresses regulatory guidance. It also utilizes information from the detailed design and procurement documents to determine the appropriate inspection, tests, and monitoring criteria for underground and inaccessible cables within the scope of the Maintenance Rule. So, I think it is our expectation, once they go in operation, that they will use state-of-the-art testing program for these underground cables.

Next.

Supplement 8.2 has been adequately addressed by the applicant for maintenance and testing of switchyard components. They follow NERC standards, industrial maintenance practices.

The applicant performed for failure mode and effect analysis of the offsite power distribution system and the landside switchyard, in accordance with the guidelines of Regulatory Guide 1.206.

We have reviewed their FMEA, and they have demonstrated that a break could not operate during a fault condition, a fault on the switchyard bus, a spurious relay trip, or a loss of control power will not result in loss of maintenance source of offsite power or cause a reactor trip.

The other interface requirements they have satisfied; namely, the applicant performed a grid stability analysis to demonstrate that the grid remains stable for loss of the largest single supply to the grid, removal of the largest load, or the loss of the most critical line. So, this is one of the interface requirements that AP1000 design has, that you must have 80 percent voltage at the reactor coolant pumps in the event of a turbine trip for at least 3 seconds to meet the accident analysis, Chapter 15 accident analysis.

The applicant has adequately addressed Supplement Information 8.3-1. Besides, the chart and transformer voltage have been already described. It's 230. They come down from 230 to 6.9 kV, which is the voltage that the RCPs and other motors used.

The next item is they have adequately addressed Supplemental Information 8.3-2 involving the site-specific condition bounded by the standard site condition for rating of the diesel generators. So, the applicant has addressed that item, that it will be based, the rating of the diesel generators will be based on the site conditions; namely, the snowfall they have, the expected winds, and snow conditions. So, based on those, they will choose the diesel generator based on those site-specific items.

CHAIRMAN RAY: Did any of these things change because of the passive design as compared --

MR. CHOPRA: Pardon me?

CHAIRMAN RAY: Did any of these things you are addressing here in the AC power system --

MR. CHOPRA: No.

CHAIRMAN RAY: -- change as a result of the passive design?

MR. CHOPRA: No, they don't. Because they have also stated that the diesel generator testing, they will follow the manufacturer's recommendations in Class 1D diesel generators, although they are not Class 1A diesels.

CHAIRMAN RAY: Okay.

MR. CHOPRA: And this concludes my presentation.

CHAIRMAN RAY: Hum?

MR. CHOPRA: This concludes my

presentation.

CHAIRMAN RAY: Okay.

MR. SEBROSKY: That is all we had on Chapter 8.

We are going to reverse presentations here. The staff has no prepared presentations for Chapter 10. This is just a summary of different information that is in this section.

CHAIRMAN RAY: Yes.

MR. SEBROSKY: I think the applicant did have a short presentation they can go over.

CHAIRMAN RAY: Please.

MS. MONROE: Right. We just briefly wanted to discuss that we were standard in Chapter 10. So, of course, we incorporated the DCD and the standard material.

We wanted to briefly discuss the circulating water system insofar as the fact that it doesn't have a safety-related function. But, in our case, as opposed to using the natural draft cooling towers, we were going to implement utilizing mechanical draft cooling towers.

By talking slightly about the circulating water system, we had a really neat picture to show we thought you might want to see.

(Laughter.)

Anytime we can use a picture -- this is a segment of our circulating water system piping, which is a pre-stress, cylindrical concrete piping. It is just huge, 10-feet in diameter and 16-feet in length. We've got several hundred sections of this installed and several hundred sections left to be installed currently at the site.

CHAIRMAN RAY: Okay. We have seen the excavation pictures before.

Anything else, Amy?

MS. MONROE: No, sir, nothing else.

CHAIRMAN RAY: All right. That finishes, then, the agenda for today, and we won't go further other than to try and capture anything that is on people's minds now for the information of Weidong primarily, but anyone else who is interested.

So, let me begin with Joy this time.

MEMBER REMPE: No comments.

CHAIRMAN RAY: Charlie?

MEMBER BROWN: Well, I want to say I appreciate everybody's presentations and the detailed review of the items for today. Thank you.

CHAIRMAN RAY: Sam?

MEMBER ARMIJO: Nothing.

CHAIRMAN RAY: I'll get you in a second. Nothing?

MEMBER ARMIJO: No.

CHAIRMAN RAY: Sanjoy, anything else?

MEMBER BANERJEE: I can't think of anything.

CHAIRMAN RAY: Well, okay. You guys wanted to say something?

MR. WHORTON: Very briefly. You had a question earlier today -- this is, again, Bob Whorton with SCE&G -- about the Seismic Technical Advisory Committee.

CHAIRMAN RAY: That's right, we did. Thank you for reminding me.

MR. WHORTON: I am not going to be here tomorrow. So I could probably respond.

CHAIRMAN RAY: Okay.

MR. WHORTON: Very briefly, during the initial development of our COLA application, we recognized the need for some expert peer review panel involvement to keep us on track mainly. And so, we formed a group called the Seismic Technical Advisory Committee. It was composed of Dr. Robert Kennedy, Dr. Carl Stepp. You're all familiar with those people. Dr. Martin Chapman from Virginia Tech, the late Dr.

Allin Cornell from Stanford University, and we also used Don Moore from Southern Company, who had already gone through and ESP application.

But these guys provided, basically, a sanity check on all of our work. And what you saw earlier as part of the application was their letter of conclusions and recommendations supporting the application.

CHAIRMAN RAY: Well, okay, but the fact that it was reflected up there really triggered something in my mind because both applicant and agency are trying to wrastle with what the implications are for a similar-sounding panel at Diablo Canyon, as they are now approaching license renewal.

Is this something that goes on or was it a one-time thing or what?

MR. WHORTON: It was a one-time thing for the application development. And in fact, all of the current applicants have used a very similar process. And in fact, we used a combined meeting with Duke Energy, Progress Energy, and Southern Company as part of the overall applications to ensure consistency from one to the other.

CHAIRMAN RAY: All right. So, it doesn't have any life after the issuance of this combined license?

MR. WHORTON: Not at this point, no, sir.

MR. SEBROSKY: This is Joe Sebrosky.

It is not considered a licensing basis document.

Cliff, there's several documents in that application. Another example is the Environmental Report. The Environmental Report has no force after the COL is granted, if it is granted.

If there is anything in the Environmental Report that needs to live on, it is captured as part of the environmental license submissions, and the staff is contemplating those. But the Environmental Report itself and, actually, Part 11 and Part 12 of the application, and you can even look at other parts, like Part 4, the tech specs, that is superseded by the tech specs that attached to the license.

CHAIRMAN RAY: Well, yes, but everything you said I could probably say about Diablo Canyon, too.

The applicant has a right to have a monitoring program if they want to. What I am trying to figure out is what cognizance did the -- and it can go on forever if they wanted to. I was just trying to figure out what credit there was, because it was mentioned here, and I had never seen it before. But it was only recognized in terms of what was presented at this time.

And I understand what you said about not being reflected as a license condition or anything of that kind. That was really what I was trying to get at.

MR. SEBROSKY: I sense we are almost closing here.

If it's possible, I just wanted to go through the list of action items that I have to report back to the Subcommittee tomorrow.

CHAIRMAN RAY: It's not only possible, but it is desirable. Please. Thank you.

MR. SEBROSKY: We have to report back to the Subcommittee on HABIT verification, how that was done, and the documentation associated with that. That is one of the action items I have.

Vogtle had several action items that I will let Amy Aughtman take care of.

But Cliff Munson, Dr. Munson was going to provide a brief presentation on the staff's view of the Technical Advisory Group tomorrow.

CHAIRMAN RAY: Which we just spoke of?

MR. SEBROSKY: Yes.

CHAIRMAN RAY: Yes. Okay.

MR. SEBROSKY: If you want, Dr. Munson went off to prepare a short presentation on his view of that, if you want to hear it. If it is not needed, then he won't need to do that.

CHAIRMAN RAY: Yes. From my standpoint anyway, just speaking for myself, I just wanted to find out what the implications were longer-term. If it was part of what the staff took cognizance of in connection with coming to its SER, Final Safety Analysis Report now, and that's the end of it, then, as far as I'm concerned, I don't need to hear more.

MR. SEBROSKY: Okay. I will verify that with Dr. Munson. I think that is the case.

CHAIRMAN RAY: Okay.

MR. SEBROSKY: If that is the case, then we won't make the presentation.

I believe I have an action item to provide an overview presentation on Rev. 18 of the DCD and how that will fit in with the COL application revisions and, also, address Mr. Brown's concern about not just staff confirmatory items, but ACRS confirmatory items. We're calling them ACRS confirmatory items, but issues that were identified by the ACRS and how they are going to be picked up, or have been picked up, in DCD

Rev. 18.

CHAIRMAN RAY: Yes. I talked with Frank about that. I think probably, Joe, we ought to do that last, so that we don't impinge on other things that people want to do because that is probably more of a dialog than a presentation, just so we understand. You were going to have some figure that we could use to understand how this works. So, yes.

MR. SEBROSKY: Okay. The last one, I'm not sure if we still have it or not. But there was a discussion about the human factors associated with whether or not Westinghouse would contemplate making changes to the human factors associated with the wet bulb temperature. And the discussion that I was trying to capture is Mr. Brown's concern that you may get frequent alarms associated with the wet bulb.

MEMBER BROWN: I didn't use the word "frequent".

MR. SEBROSKY: I'm sorry. Alarms associated with an unexpected condition.

MEMBER BROWN: If it is an accepted, allowable, blessed condition, it just seemed to be unusual to have an alarm set below that if it was part of the accepted design basis of the plant. That's all.

MR. SEBROSKY: Well, at one point, I

thought I had heard a commitment, and maybe I wrote it down incorrectly, that Westinghouse and SCE&G were going to --

MEMBER BROWN: Well, they said it was an HFE item that had not been evaluated yet, or something like that.

Did I say that right, Ed?

MR. CUMMINS: Yes, you did.

MEMBER BROWN: Thank you.

So, I didn't know who had the ball after that. It is as good a time as any to ask that.

MR. CUMMINS: I think it is Westinghouse's ball, but I think it is sort of below the level of the license. I mean we don't have alarm setpoints for the other hundreds of alarms that we have. There's kind of an alarm principle that you are asking about, and I think we need to find out what our alarm principle is.

MEMBER BROWN: Yes, that's it.

MR. CUMMINS: Yes.

MR. SEBROSKY: So, there's no report back on that then to the Subcommittee?

MEMBER BROWN: It was an observation. Okay? I guess my general point was, if you have got an accepted plant boundary of conditions, you've got now an accepted higher wet bulb temperature that resulted in certain system performance characteristics, and it is going to be a little higher. And if you get to that, but yet the setpoint is below that --

CHAIRMAN RAY: Was there a setpoint below that?

MEMBER BROWN: Yes, that is what he said. He said the setpoint was below. If you went to 95, or whatever the number was, 87.3 wet bulb temperature, you would exceed the alarm temperature on the cooling water system alarm setpoint output, I guess output/input, whatever, wherever they have got it.

And that just seemed to me unusual for a plant condition that was within the system design. That's all.

CHAIRMAN RAY: Okay. I understand.

MEMBER BROWN: I am not saying it is going to happen frequently or --

MR. CUMMINS: This is Ed Cummins again.

The problem is we don't have any interaction -- we will respond to Charlie with our answer to that question, yes.

CHAIRMAN RAY: Thank you, Ed.

Very good. Thank you, Joe.

MR. SEBROSKY: Thank you.

CHAIRMAN RAY: All right. Anything else anybody else has?

(No response.)

Yes?

MEMBER BROWN: Forgive me, please.

Are we going to talk about Rev. 18/17? Was that part of the discussion?

CHAIRMAN RAY: Yes, that's where I said --

MEMBER BROWN: I missed the nuance.

CHAIRMAN RAY: -- do it last.

MEMBER BROWN: Yes. Fine.

CHAIRMAN RAY: Okay. Otherwise, we will resume at 8:30. We will also have anything that Vogtle wishes to give to the Subcommittee in response to the points that we raised with --

MEMBER BANERJEE: I have already received something.

CHAIRMAN RAY: Good.

MEMBER BANERJEE: So, I will look at it.

CHAIRMAN RAY: All right.

And with that, we will see you tomorrow.

Thank you.

(Whereupon, at 4:53 p.m., the proceedings in the above-entitled matter were adjourned for the day, to reconvene the following day, Tuesday, January

11, 2011, at 8:30 a.m.)

VCS
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NEW NUCLEAR PROJECT

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VC Summer Units 2 and 3 Overview and Observations from Excavation Activities

Stephen A. Byrne – Executive VP – Generation

Alfred M. Paglia - Manager Licensing - New Nuclear Deployment


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January
2011

VC Summer Units 2 and 3 FSAR Section 2.4

Steve Summer

SCANA Services – Supervisor
Environmental Services

FSAR Section 2.4
Hydrologic Engineering

- DCD Incorporated By Reference
- No Exemptions Requested
- 1 Administrative Departure – 2.0-1 pertaining to section numbering to align with RG 1.206 and facilitate NRC review

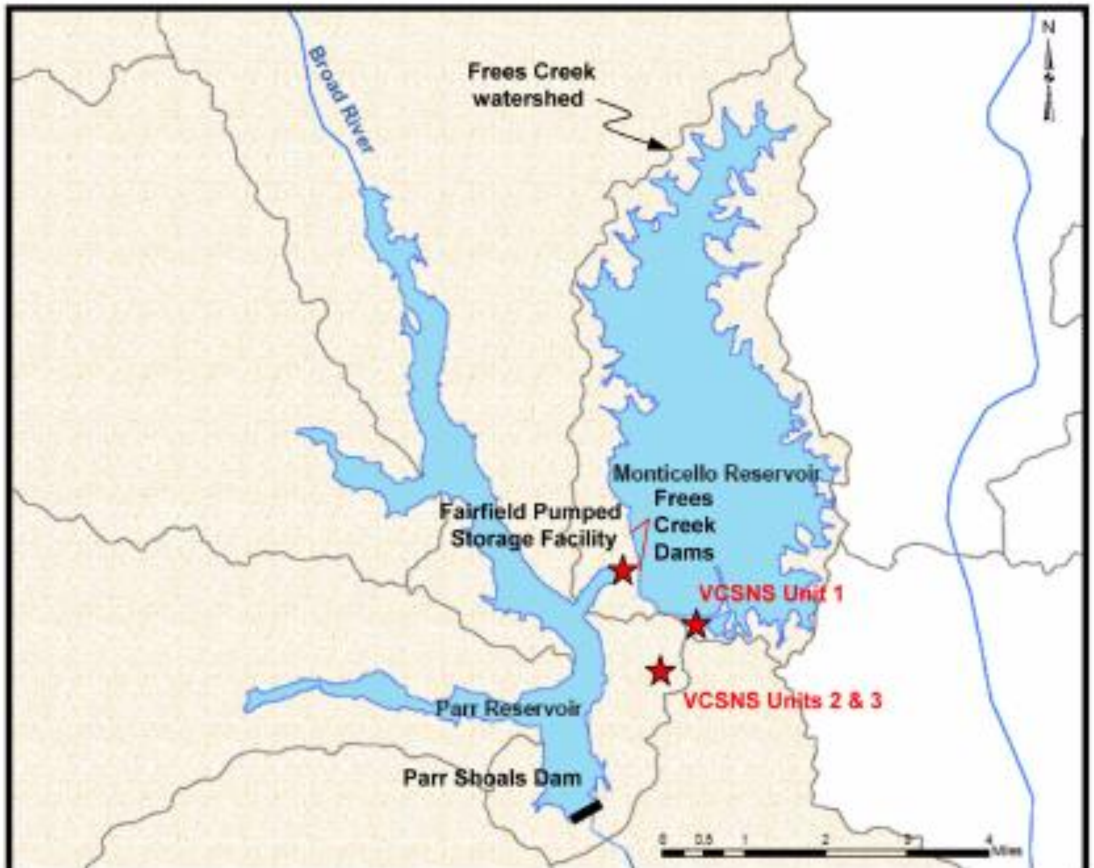
Major Items of Interest

- 6 COL Information Items Addressed
  - 2.4-1 Hydrological Description
  - 2.4-2 Floods
  - 2.4-3 Cooling Water Supply
  - 2.4-4 Groundwater
  - 2.4-5 Accidental Release of Liquid Effluents into Ground and Surface Water
  - 2.4-6 Flood Protection Emergency Operation Procedures

Major Items of Interest

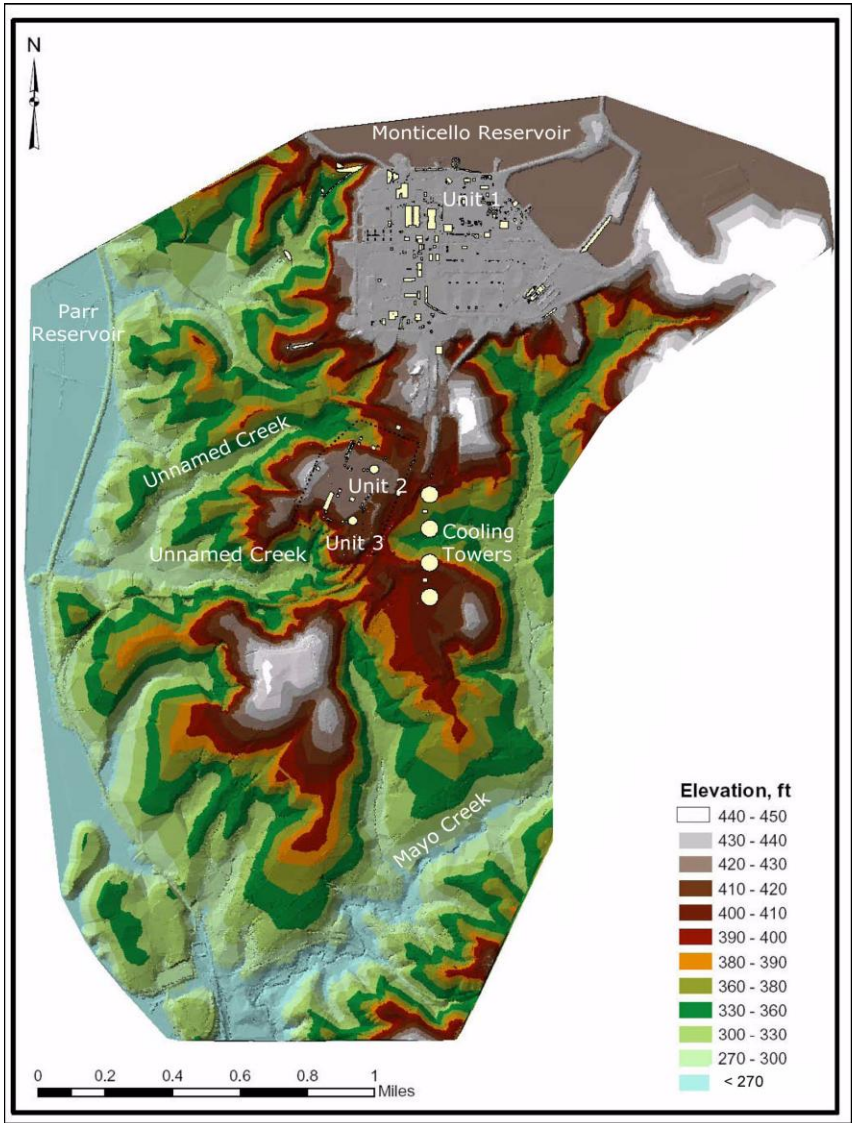
- COL Item 2.4-1 Hydrological Description - **Describe major hydrologic features on or in the vicinity of the site.**

Major Surface Water Hydrologic Features



Data sources:
1. USGS DEM files for Jenkinsville and Salem Crossroads
2. Area survey data from Glenn Associates Surveying, Inc
3. Recent satellite image of the Monticello Reservoir area

Site Topography



Major Items of Interest

- COL Item 2.4-2 Floods - **Address site-specific information on historical flooding and potential flooding factors, including the effects of local intense precipitation.**
  - No risk to Safety-Related Systems, Structures, or Components (SR SSCs) from flooding.
    - Probable Maximum Flood level is more than 100 feet below site grade
    - Site is not susceptible to surges, seiches and tsunami.

Major Items of Interest

- COL Item 2.4-3 Cooling Water Supply - **Address the water supply sources to provide makeup water to the service water system cooling tower.**
  - The Broad River and Monticello Reservoir are used as the cooling water makeup source (non-safety related).
  - Ice effects are highly unlikely.
  - The Broad River is adequate for non-safety uses even during low-flow conditions.

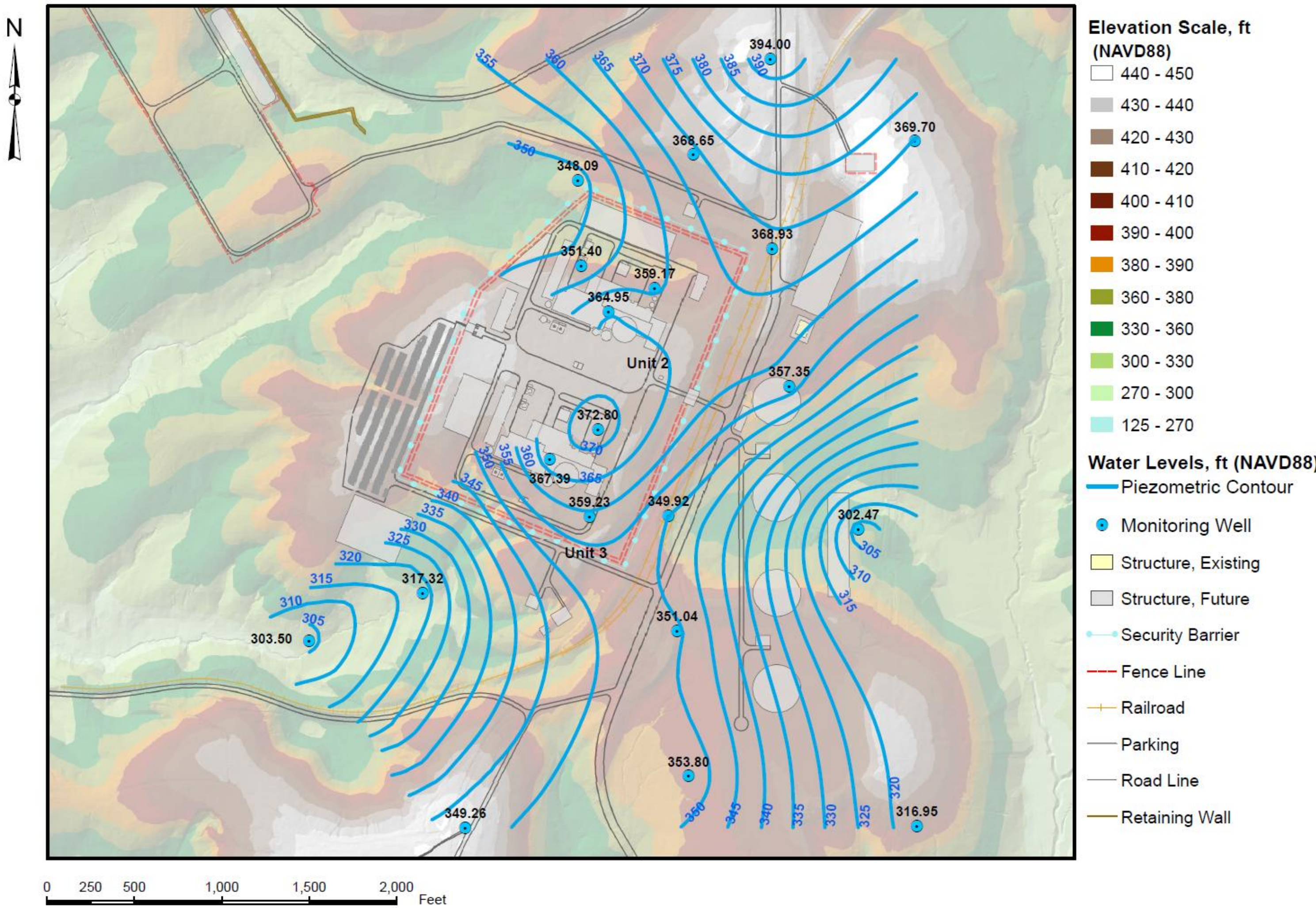
Major Items of Interest

- COL Item 2.4-4 Groundwater - **Address site-specific information on groundwater**.
  - There are no plans to use local groundwater for construction or operation of VCSNS Units 2 and 3.

Major Items of Interest

- COL Item 2.4-4 Groundwater (Cont'd)
  - Units 2 and 3 are located on a ridgetop. Piezometric contour maps indicate that groundwater from the ridgetop flows away from the site.

Major Items of Interest



Major Items of Interest

- COL Item 2.4-4 Groundwater (cont'd)
  - Design plant grade elevation is 400 feet NAVD88.
  - The maximum allowable groundwater level is 398 feet NAVD88 (AP1000 DCD).
  - The maximum expected groundwater level is 380 feet NAVD88 (20 feet below the plant grade elevation), well below DCD value.

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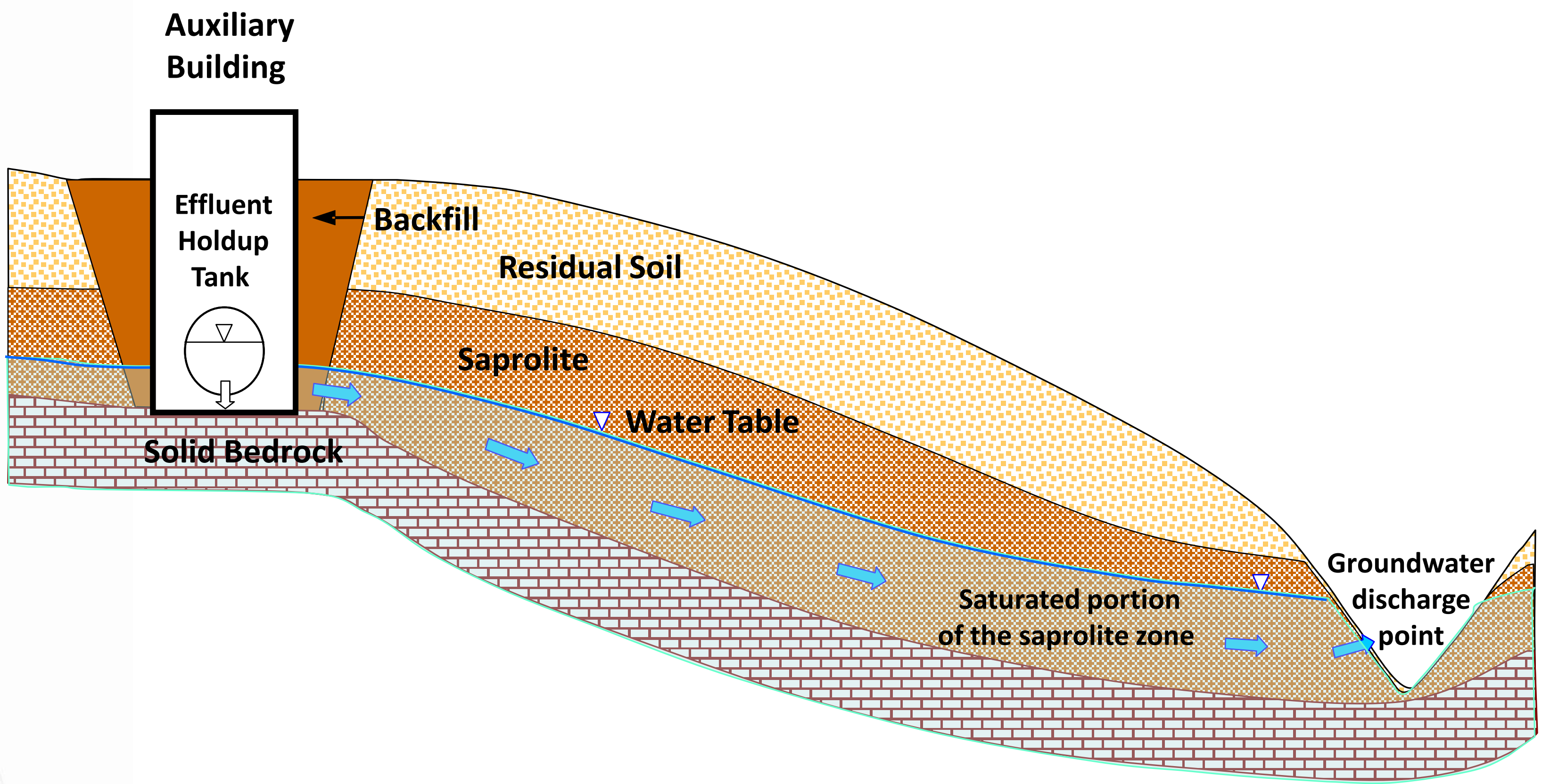
Major Items of Interest

- COL Item 2.4-5 - Accidental Release of Liquid Effluents into Ground and Surface Water - **Address site-specific information on the ability of the ground and surface water to disperse, dilute, or concentrate accidental releases of liquid effluents. Also address the effects of these releases on existing and known future use of surface water resources.**

Major Items of Interest

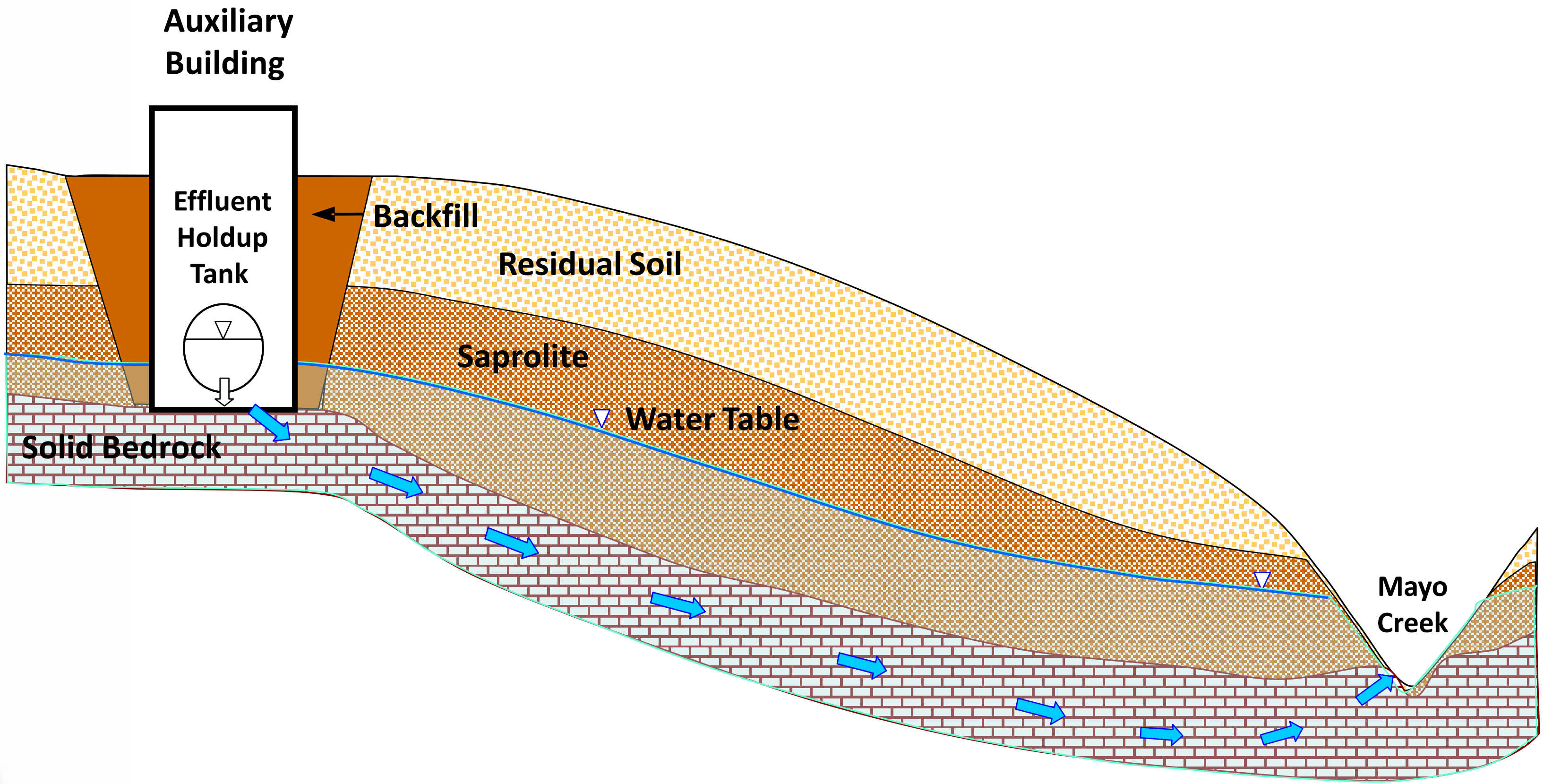
- COL Item 2.4-5 - Accidental Release of Liquid Effluents into Ground and Surface Water (cont'd)
  - Evaluation shows that an accidental liquid release of effluents in groundwater would not exceed 10 CFR Part 20 limits.
  - Three conceptual flow transport models (one saprolite and two bedrock) are presented.

Major Items of Interest



Saprolite Pathway (conceptual)

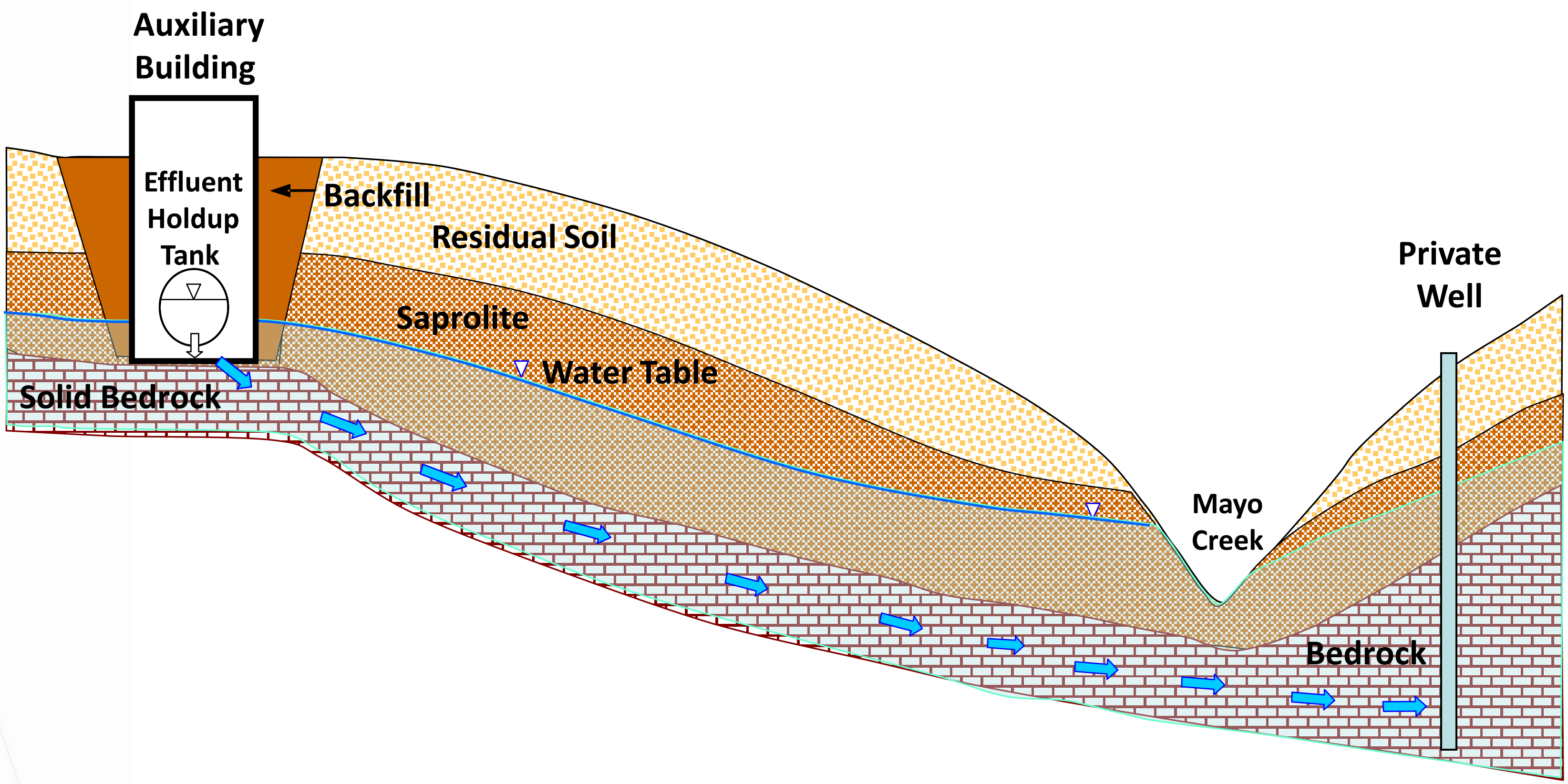
Major Items of Interest



Bedrock Pathway to Broad River or Mayo Creek

(conceptual)

Major Items of Interest



Bedrock Pathway to the site boundary below Mayo Creek (conceptual)

Major Items of Interest

- COL Item 2.4-6 Flood Protection Emergency Operation Procedures - **Address any flood protection emergency procedures required to meet the site parameter for flood level.**
  - Since the SR SSCs at Units 2 and 3 are not subject to flooding, no additional flood protection measures and no emergency procedures are required.

Major Items of Interest

- RAIs
  - 2 questions on flooding
  - 6 questions on groundwater
  - 14 questions on accidental release of radioactive liquid effluents in ground and surface waters

  - All questions have been answered and are considered to be resolved.

Questions?

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

Summer Units 2 and 3 COL Application Review

Section 2.4

Hydrologic Engineering

January 10 - 11, 2011

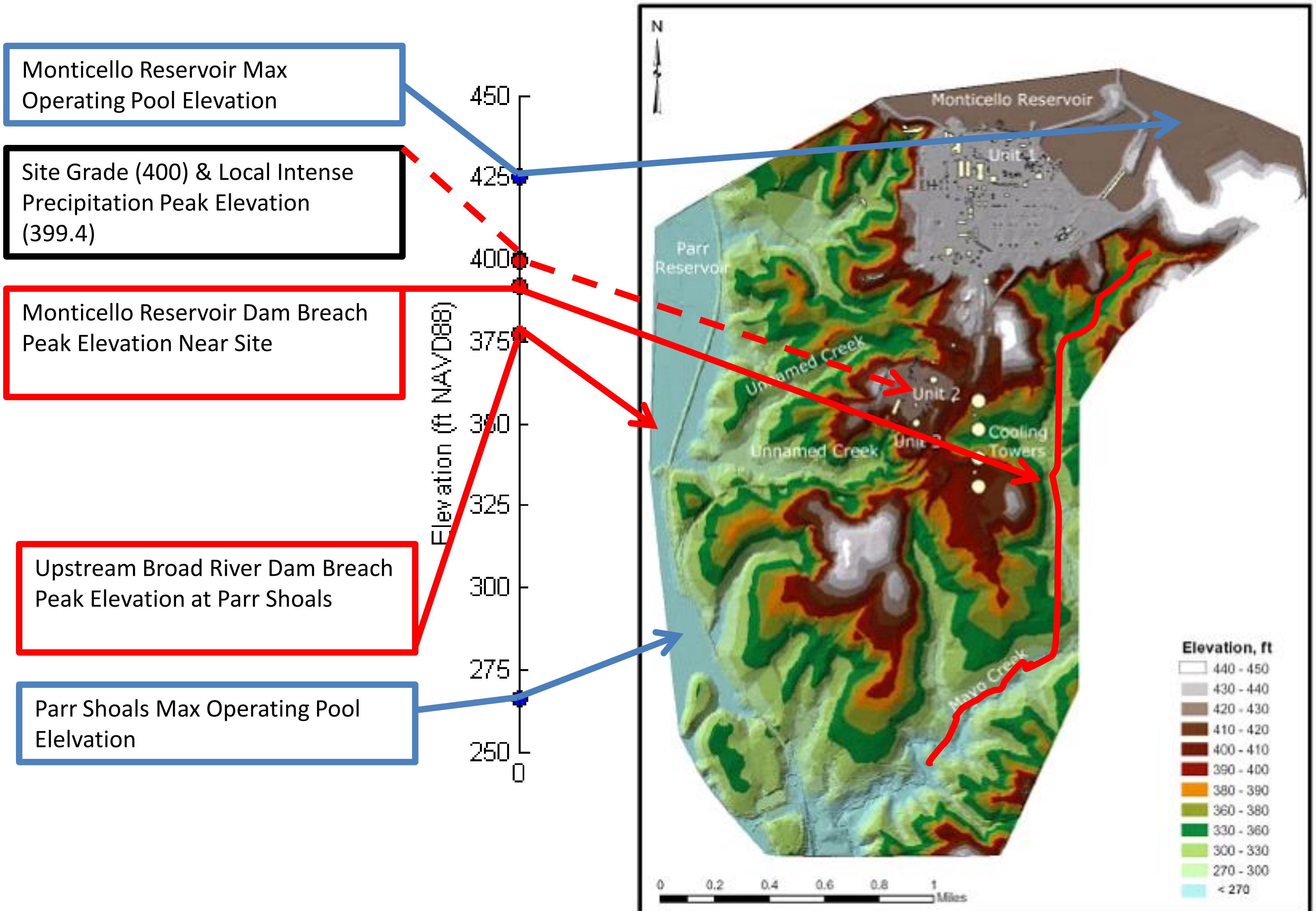
Staff Review Team

- Technical Staff
  - Ken See
  - Daniel Barnhurst
  - Steven Schaffer
  - Lance Vail, Pacific Northwest National Lab (PNNL)
  - Lyle Hibler, PNNL
  - Mike Fayer, PNNL
- Project Management
  - Joe Sebrosky

Floods (FSAR Sections 2.4.1 through 2.4.5, and 2.4.7 through 2.4.10)

- The staff reviewed various flooding mechanisms to determine the site characteristics related to design-basis flood and required flooding protection.
- Specific items of interest:
  - The applicant identified the flood caused by local intense precipitation as the design-basis flood.
  - The staff has identified Confirmatory Items 2.4.2-1 which specifies in future revisions to the FSAR channel maintenance procedures be described and cross-section maps used in the analysis be provided .
  - The staff analyzed the flood potential due to a postulated failure of the Monticello Reservoir berm; and confirmed applicant’s determination of local intense precipitation as the DBF.

FSAR Sections 2.4.4: Major Hydrologic Surface Water Features



Effects of Local Intense Precipitation (FSAR Section 2.4.2.4.3)

The applicant identified the flood caused by local intense precipitation as the design-basis flood. NRC staff confirmed this determination.

- Specific items of interest:
  - HEC-RAS was used to estimate peak flood elevations.
  - Staff determined that peak elevations from the postulated breach would not exceed the site grade elevation.
  - Staff requested in RAI 2.4.2-1 that the applicant provide a description of the program to ensure that drainage channels remain clear as a result of staff findings on the site drainage sensitivity to channel roughness after local intense precipitation events
  - Staff requested in RAI 2.4.13-14 a map of the modeled cross-section to support the local intense precipitation analysis be included in the FSAR
  - Items are being tracked for inclusion in future revision of the FSAR as Confirmatory Item 2.4.2-1

Potential Dam Failures (FSAR Section 2.4.4)

- The staff postulated a dam failure scenario in addition to those discussed in the FSAR by the applicant
- Specific items of interest:
  - The berm between Monticello Reservoir and Mayo Creek was postulated to fail and results flow into Mayo Creek.
  - Dam Safety Office guidance was used to develop estimates for dam breach peak flows.
  - HEC-RAS was used to estimate peak flood elevations.
  - Staff determined that peak elevations from the postulated breach would not exceed the site grade elevation.

FSAR Section 2.4.10: Flooding Protection Requirements

- The staff reviewed the characteristics of the design-basis flood for any required flooding protection.
- The NRC staff has established the local intense precipitation event as the DBF and as discussed in Section 2.4.2 of the SER, the staff determined that flood protection is not required.

FSAR Section 2.4.12: Groundwater

- The staff reviewed the hydrogeological characteristics of the site.
  - Applicant measured characteristics and properties to support groundwater conceptual models and estimate direction and velocity of potential radioactive contaminants.
  - Applicant determined maximum groundwater level would remain below the DCD requirement
- Specific items of interest:
  - Staff reviewed the characteristics and properties of the proposed site as described by the applicant.
  - Staff concluded that hydrogeological characterization is sufficient to support both the groundwater conceptual model and the site characteristic for maximum groundwater elevation based on supplemental information to be included in the FSAR
  - Staff established Confirmatory Item 2.4.12-1 to verify information is included in next revision of FSAR Section 2.4

FSAR Section 2.4.13: Accidental Releases of Radioactive Liquid Effluent in Groundwater and Surface Water

- The staff reviewed postulated accidental release from the radwaste management system and its potential effects on groundwater and surface water.
  - Applicant evaluated the ability of the groundwater and surface water environment to delay, disperse, dilute, or concentrate liquid effluent.
  - Applicant described the effects of postulated releases on known and likely future uses of water resources.
- Specific items of interest:
  - Staff reviewed the postulated release and pathway analysis methodologies and determined they were acceptable
  - Staff examined the results and determined that the concentrations were below the acceptance criteria in Branch Technical Position 11-6.
- The staff's review of the FSAR Section has been completed

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VC Summer Units 2 and 3 FSAR Section 13.3

Emergency Planning

Tim Bonnette

SCE&G – Emergency Preparedness

Presentation Overview

- DCD Departure
- Plan Design
- Site Layout
- Command and Control
- Emergency Facilities
- Emergency Response
- Emergency Planning Zone
- Offsite Education and Alerting

DCD Departure

- VCS DEP 18.8-1 – Locations of the Technical Support Center (TSC) and Operational Support Center (OSC)
  - TSC will be located in the New Nuclear Operations Building
  - Each OSC for Units 2 & 3 will be located in its respective Annex Building, in the area designated as the DCD TSC.

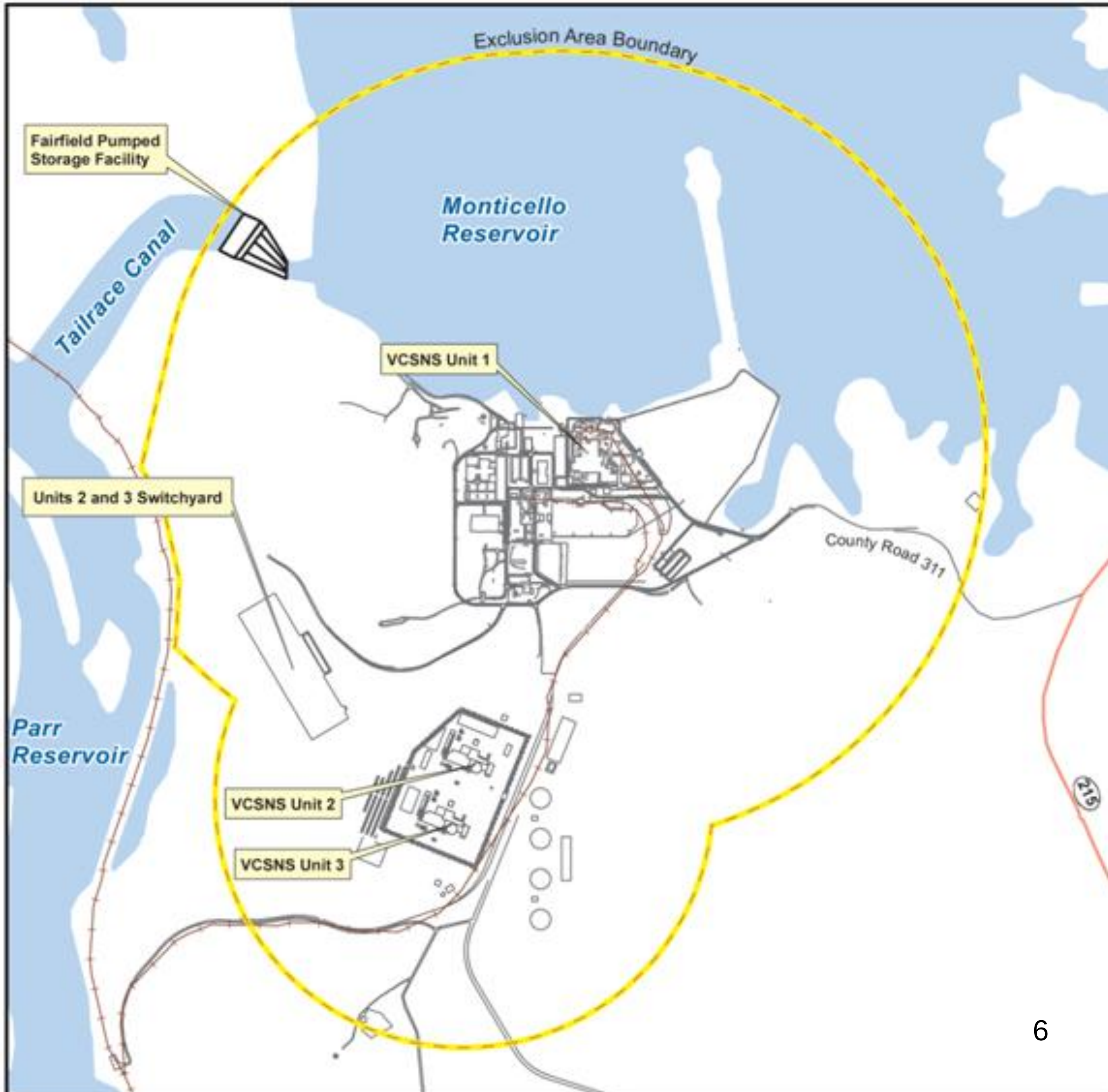
Emergency Plan Design

- Single plan for all three Units
  - In accordance with NUREG-0654
- Developed in accordance with:
  - NUREG-0654/FEMA-REP-1 Rev 1
  - 10 CFR 50.47
  - 10 CFR 50 Appendix E
- Emergency Action Level (EALs) developed in accordance with:
  - NEI 07-01 Rev 0

VCS Site Layout

- Single Nuclear Exclusion Area
  - Two points of ingress and egress into the Nuclear Exclusion Area
    - South of the Units
    - East of the Units
- Dual Protected Areas
  - Unit 1
  - Units 2 & 3

Site Map


Exclusion Area Boundary
Fairfield Pumped Storage Facility
Monticello Reservoir
Tailrace Canal
VCSNS Unit 1
Units 2 and 3 Switchyard
County Road 311
Parr Reservoir
VCSNS Unit 2
VCSNS Unit 3
215

Command and Control

- Activation of the Emergency Response Organization (ERO) at an Alert or higher classification
  - Each emergency facility has a element of command and control
- Declared emergency involving a single Unit
  - The affected Unit's Control Room has the lead
- Declared emergency involving the entire Site
  - Unit 1 Control Room is the lead Control Room
- Declared emergency involving Units 2 & 3 only
  - Unit 2 Control Room is the lead Control Room

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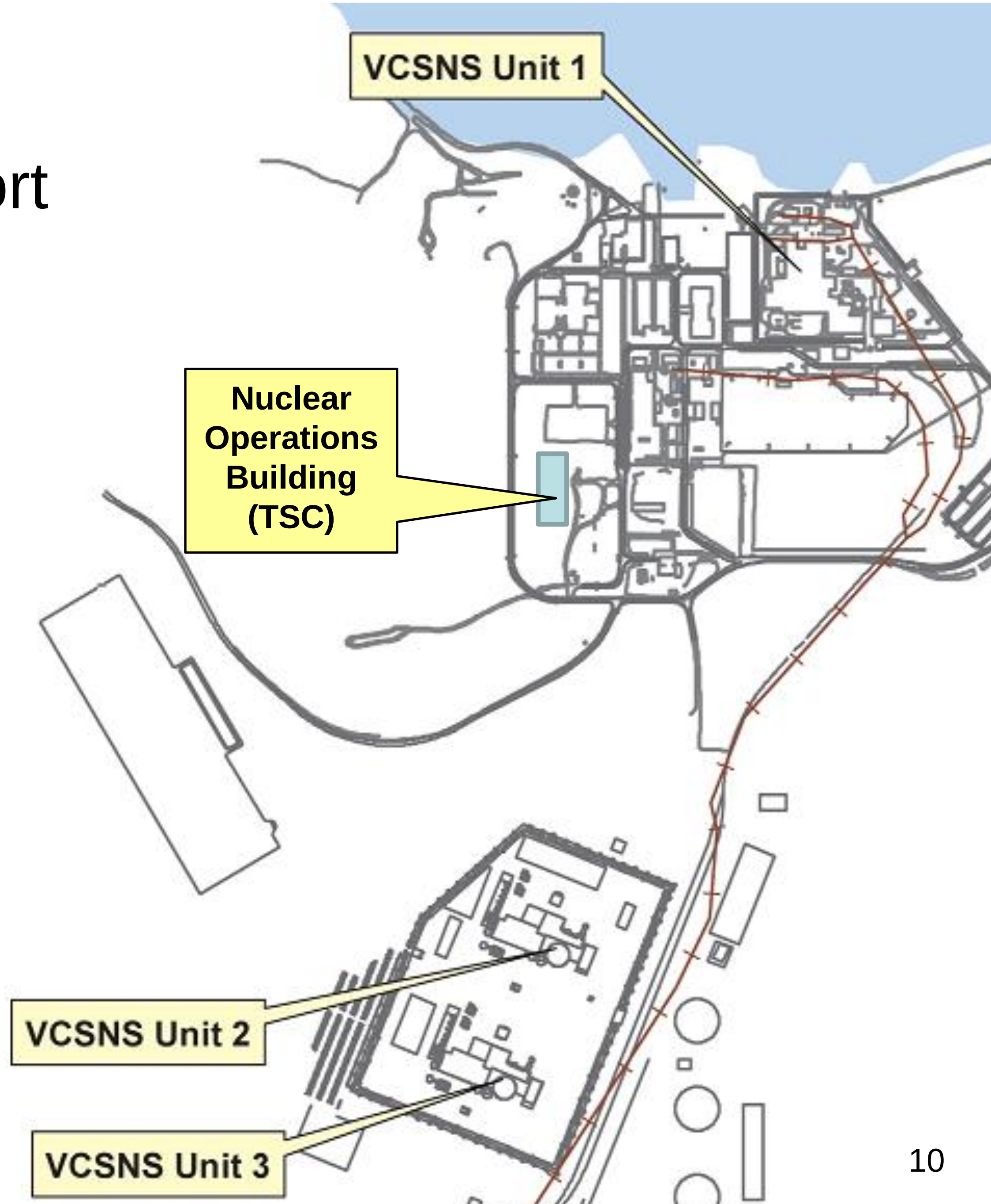
Emergency Facilities

- 3 Control Rooms
  - – Unit 1 (existing)
  - – Units 2 & 3 – located per DCD
- 3 Operational Support Centers (OSC)
  - – Unit 1 (existing)
  - – Units 2 & 3 – located in the respective Annex Building on the DCD 117'-6" Elevation

Emergency Facilities

- Technical Support Center (TSC)
  - Common for all three Units
  - Meets the requirements of NUREG-0696, with exception of being adjacent to the Control Rooms
  - Data and communication links between each Unit and the TSC are in accordance with the Cyber Security Plan

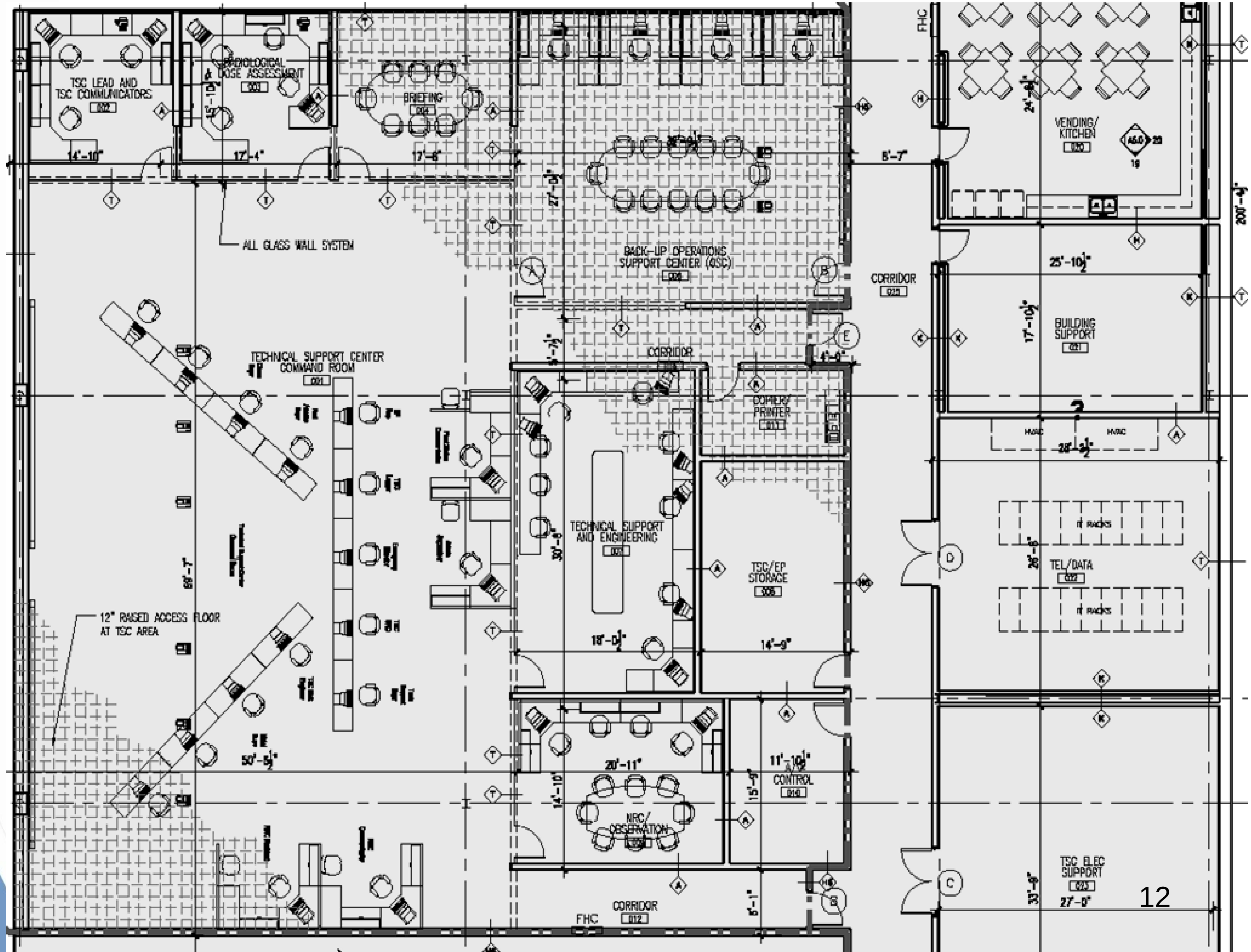
Technical Support Center



Emergency Facilities

- TSC (continued)
  - Incorporates human factors engineering (HFE) to support emergencies involving one, two, or three Units
    - Centralized Command Area
    - Adjacent support areas
  - ERO positions support continuous collaboration with the affected Control Room(s)

Technical Support Center Layout



Emergency Facilities

- Emergency Operations Facility (EOF)
  - Existing
  - Common for all three Units
  - Located offsite, outside the Emergency Planning Zone (EPZ)
- Joint Information Center (JIC)
  - Existing
  - Common for all three Units
  - Located offsite, outside the EPZ

EOF and JIC Facilities

Emergency Response

- Unusual Event Classification
  - Lead Control Room Shift Supervisor becomes the Interim Emergency Director (IED)
  - Supported by:
    - Shift Staffing from both the affected and unaffected Units
    - Additional staffing called in at the IED's discretion
  - All activities are controlled through the Control Room or by assigned personnel
  - Escalation to a higher classification requires activation of the Emergency Response Organization (ERO)

Emergency Response

- Alert, Site Area Emergency, and General Emergency Classifications
  - The Control Room (SRO) is the lead for operational plant monitoring and operational control
  - The TSC takes the lead in the onsite evaluations and decision making for mitigation strategies, in collaboration with the Control Room(s)
  - The EOF takes the overall Command and Control and is the lead facility for classifying an event, recommending Protective Actions, and notifying the offsite authorities

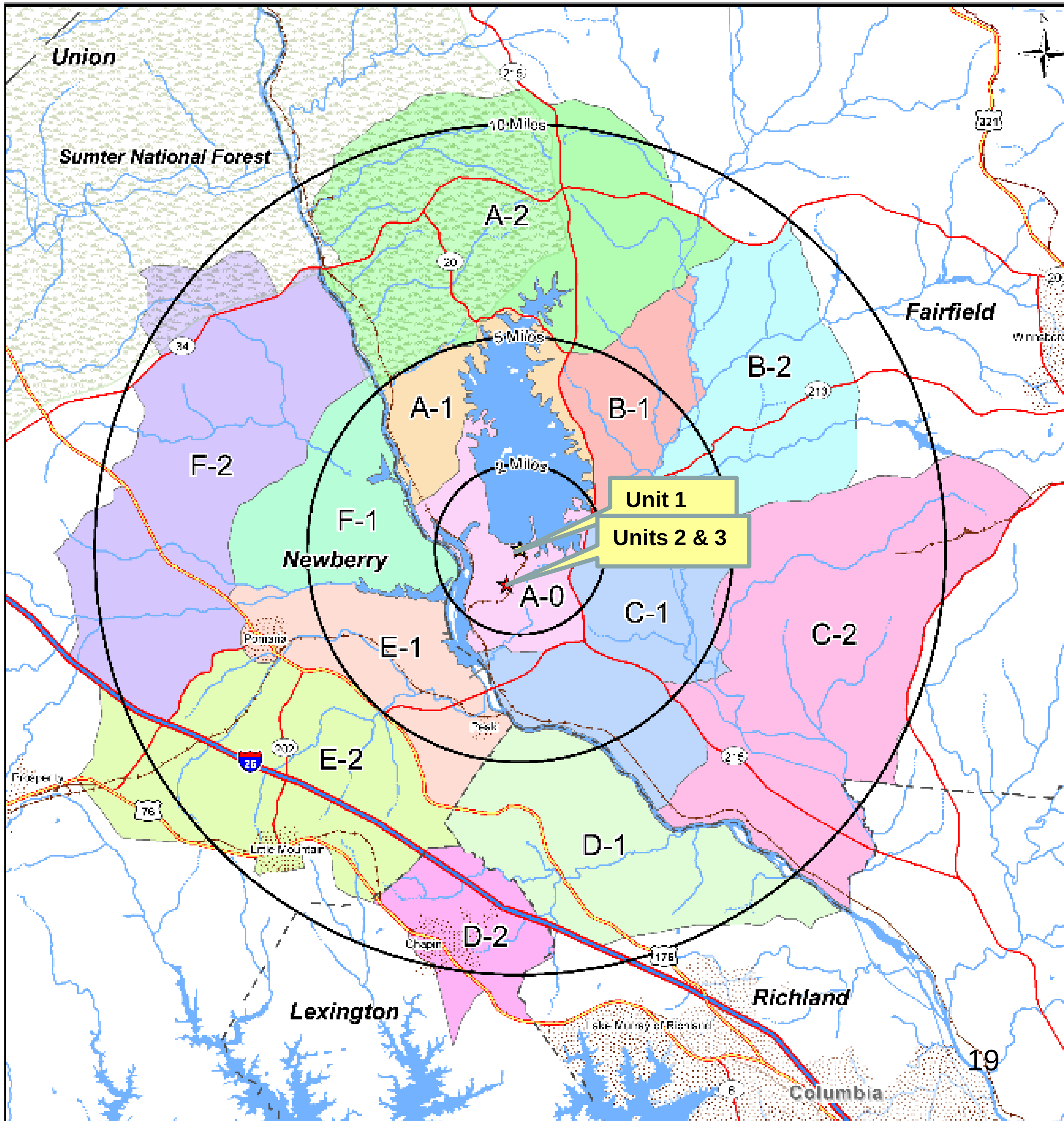
Emergency Response

- Alert, Site Area Emergency, and General Emergency Classifications (continued)
  - The OSC provides the support personnel to implement the in-plant mitigation strategies and conduct onsite evaluations to protect public health and safety
  - The JIC provides the media interfaces needed to ensure the public is kept up to date with the event and mitigation progression

Emergency Planning Zone (EPZ)

- EPZ boundaries remain the same
- Agreed upon by the State of SC and the risk counties (Fairfield, Lexington, Newberry, & Richland)
- Reviewed and accepted by FEMA

EPZ Map



Union
Sumter National Forest
10 Miles
5 Miles
2 Miles
A-2
A-1
A-0
B-1
B-2
C-1
C-2
D-1
D-2
E-1
E-2
F-1
F-2
Unit 1
Units 2 & 3
Newberry
Fairfield
Lexington
Richland
Columbia
Pomaria
Peak
Prosperity
Little Mountain
Chapin
Lake Murray of Richland

Offsite Education

- Annual Calendar Distribution
  - Details actions and guidance for members of the public
  - Distributed to all residents and businesses within the EPZ, as well as to all site employees
  - Includes self addressed and postage paid cards for residents with special needs
- Emergency Responder Training
  - Basic radiological training is provided to all first response agencies within the risk counties and selected State agencies

Offsite Alerting

- VCS Notifications and Alerting
  - Emergency Notification Form
  - Alert and Notification System
- State and Local Alerting
  - Back-up Route Alerting
  - Emergency Alert System

Questions?

U.S.NRC

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Protecting People and the Environment

Presentation to the ACRS Subcommittee

Virgil C. Summer Units 2 and 3 COL Application Review

ASE Section 13.3 and Chapter 18

Emergency Planning, and

Human Factors Engineering

January 10-11, 2011

Staff Review Team

- Technical Staff
  - **Ned Wright,** Section 13.3
  - **Paul Pieringer,** Chapter 18

- Project Managers
  - **Denise McGovern,** Section 13.3
  - **Anthony Minarik,** Chapter 18

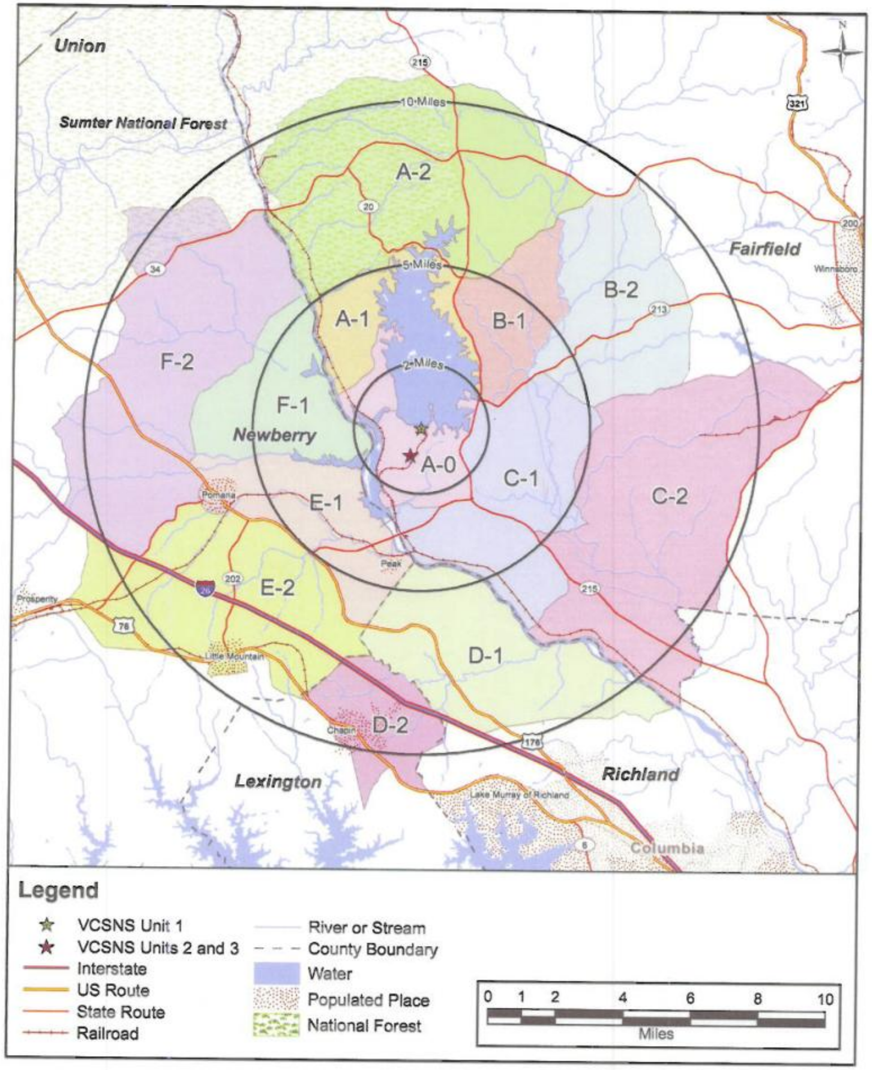
Emergency Planning

- EPZ
  - Applicant has proposed an EPZ for Units 2/3 that is the same for Unit 1
  - Reviewed and approved by the State of South Carolina and 4 Risk Counties prior to COL submittal
  - FEMA inquired as to whether the EPZ needed to be expanded based on the new reactor siting

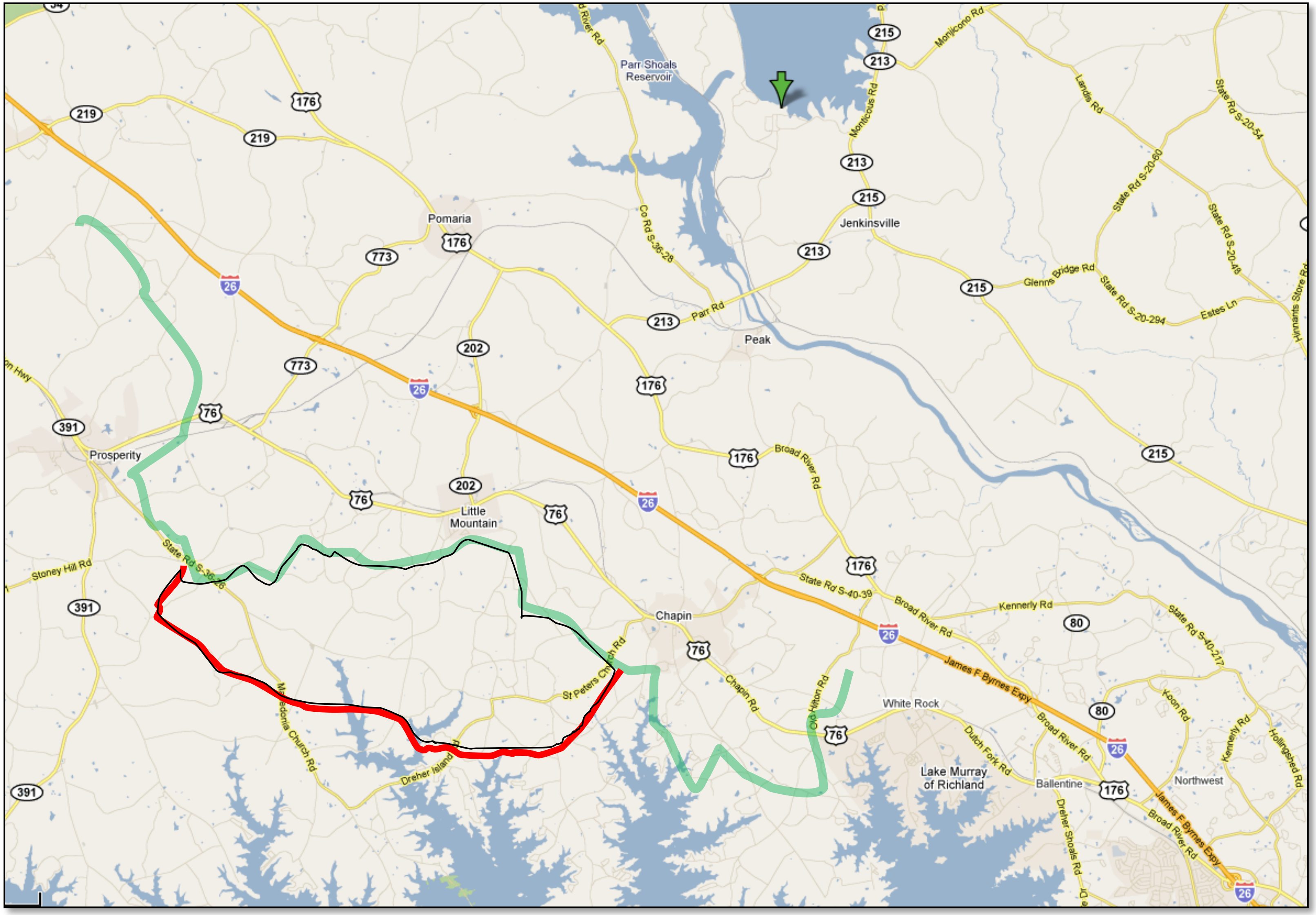
Technical Support Center Location

- Consolidated TSC for all 3 units
  - Distance
    - Transit time from any MCR is 10-15 minutes
    - Compensated by enhanced communications capabilities
  - Adequate Capability
    - Demonstration of capability by an EP-ITAAC

VC Summer EPZ



VC Summer EPZ



Supplemental Information

- The VCSNS Emergency Plan describes dedicated and diverse communications capabilities between the control rooms, TSC, OSC, and the EOF. These dedicated communications links include:
  - phone link for the Affected Unit to dispatch OSC teams between the OSC, TSC, and Control Room.
  - phone link for use by the ED, EPM, and Shift Supervisor/EPOS between the Affected Unit Control Room, the TSC, and the EOF.
  - phone link for transmission of technical data between the TSC, Affected Unit Control Room, and the EOF.
  - phone link to discuss mitigating activities and priorities between the TSC and EOF.
  - Station telephone line that is a communication link between activated facilities.
- The phone links in the station have diverse and back-up power supplies

Summer FSAR Chapter 18

Human Factors Engineering (HFE)

FSAR Section	Site-Specific Evaluations
18.1 Overview	• None*
18.2 HFE Program Management	• VCS COL 18.2-2, Location of the Emergency Operations Facility
18.3–18.7	• None*
18.8 Human-System Interface Design	• VCS DEP 18.8-1, Location of the Technical Support Center (TSC) and Operational Support Center (OSC)
18.9–18.14	• None*

* This section is entirely IBR or IBR/standard.

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VC Summer Units 2 and 3 Action Item 63

Amy M. Monroe – Licensing
New Nuclear Deployment

FSAR 2.2.3 Evaluation of Potential Accidents

- ACRS requested calculations on hazards due to offsite chemicals were provided (ML103140717).

- Hazard scenarios were evaluated for each accident category identified in RG 1.206, including hazards from explosions, flammable vapor clouds (delayed ignition), and toxic chemicals from nearby transportation and industrial facilities.

FSAR 2.2.3 Evaluation of Potential Accidents

- Analyses showed that effects of explosions and flammable vapor clouds would not pose a threat to any safety-related systems, structures, or components.
- Analyses showed that toxic vapor clouds would not exceed toxicity limits in the control room and would not pose a threat to control room operators.

Questions?

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Protecting People and the Environment

Presentation to the ACRS Subcommittee

V. C. Summer Units 2 and 3 COL Application Review

Action Item 63

(Staff confirmatory calculations of offsite chemical releases)

January 10 -11, 2011

Staff Review Team

- Technical Staff
  - David Sisk, Siting and Accident Consequences Branch
  - Shie-Jeng Peng, Containment & Ventilation Branch
- Project Managers
  - Don Habib and Joe Sebrosky

Section 2.2.3, Evaluation of Nearby Accidents – Toxic Chemicals

- Brief ACRS on confirmative calculation results on the impact on control room habitability due to potential releases of offsite chemicals
- Staff evaluated chemical hazards stored or transported within 5 miles of the site
- Staff used ALOHA to determine safe distances
- Distance to the control room at ground level was less than the calculated safe distances
- Three site-specific chemicals could exceed IDLH at the Control Room Intake:
  - 28% ammonium hydroxide (Unit 1)
  - Cyclohexylamine (Norfolk Southern rail)
  - Chlorodifluoromethane (Norfolk Southern rail)

Section 2.2.3, Evaluation of Nearby Accidents – Explosions

- Max. probable solid boxcar cargo = 132,000 lbs (RG 1.91)
- TNT equivalence = 1 for non-munition explosives (RG 1.91)
- One boxcar is evaluated because pressure waves from subsequent explosions are not cumulative
- Exceptions include certain exotic materials (nitroglycerine)
- Rail cargos near this site do not normally contain munitions or exotic materials
- Staff evaluated solid materials using RG 1.91
- Staff evaluated liquid and gases using the ALOHA
- Staff found that the pressure wave from all nearby explosives would not exceed 1 psi at safety-related SSCs

VCS COL 6.4-1, Concentrations of Site-Specific Chemicals, Staff Confirmative Calculation Results (HABIT)

- Staff performed a more detailed analysis for the 3 toxic chemicals using HABIT.

Chemical	MCR Concentration	IDLH Limit
28% Ammonium hydroxide (VCSNS Unit 1)	68 ppm	300 ppm
Cyclohexylamine (Offsite railcar)	4 ppm	10 ppm
Chlorodifluoromethane (Offsite railcar)	357 ppm	1,200 ppm

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Presentation to the ACRS Subcommittee

V.C. Summer Nuclear Station Units 2 and 3 COL Application Review

Advanced Safety Evaluation Section 2.5
Geology, Seismology, and Geotechnical Engineering

January 10, 2011

Staff Review Team

- Technical Staff
  - Dr. Clifford Munson, Senior Level Advisor and Seismologist
  - Dr. Gerry L. Stirewalt, Senior Geologist
- Project Management
  - Joe Sebrosky

Overview

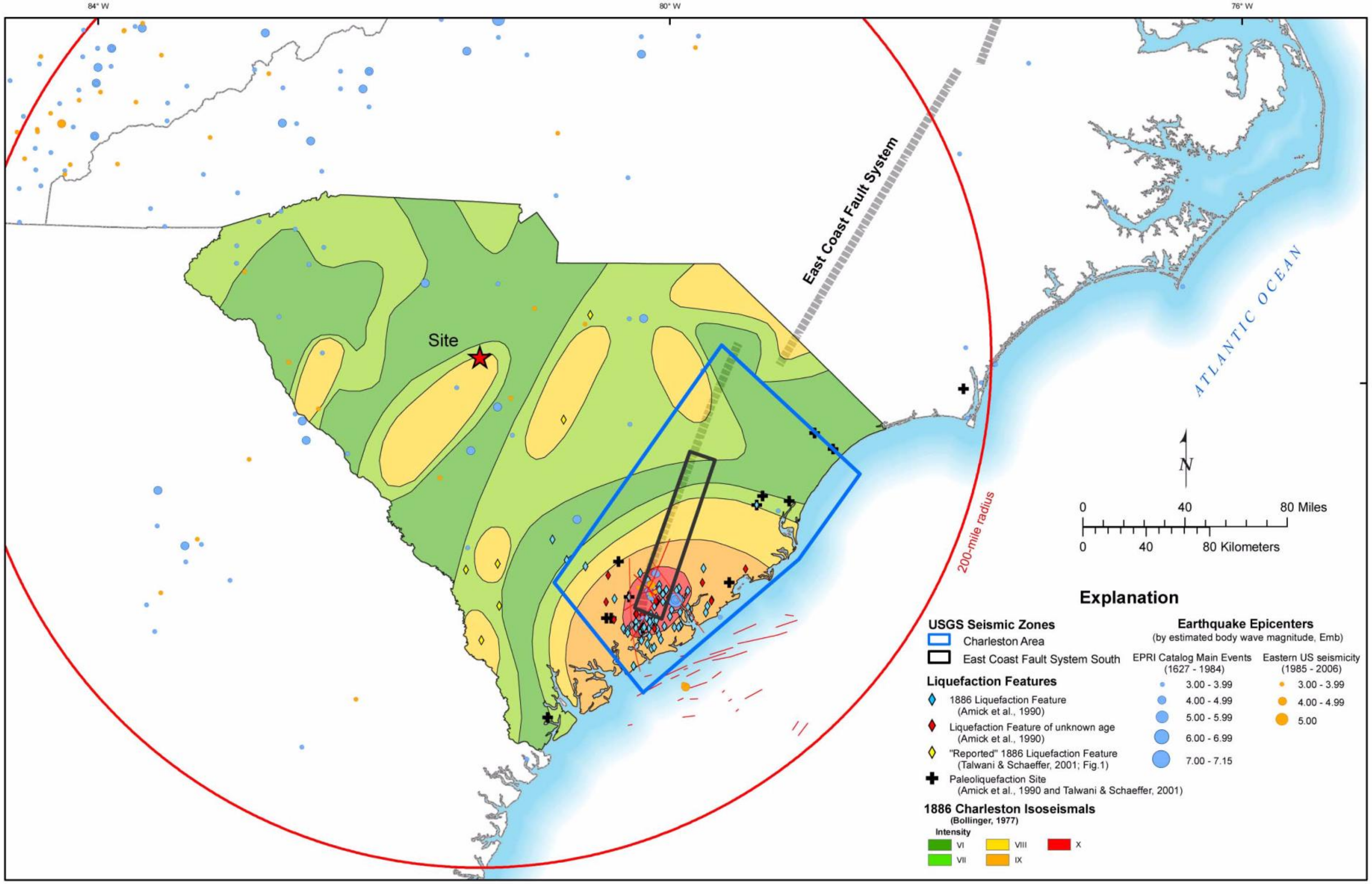
- Section 2.5
  - Topics of Interest
    - Action item from July 2010 ACRS meeting to compare EPRI seismic source model used by applicant with most recent USGS model
    - Field observations by NRC geologists on geologic mapping of the Unit 2 excavation for assessing the presence of potential tectonic features (August 2010)

EPRI and USGS (2002) Seismic Source Model Comparison

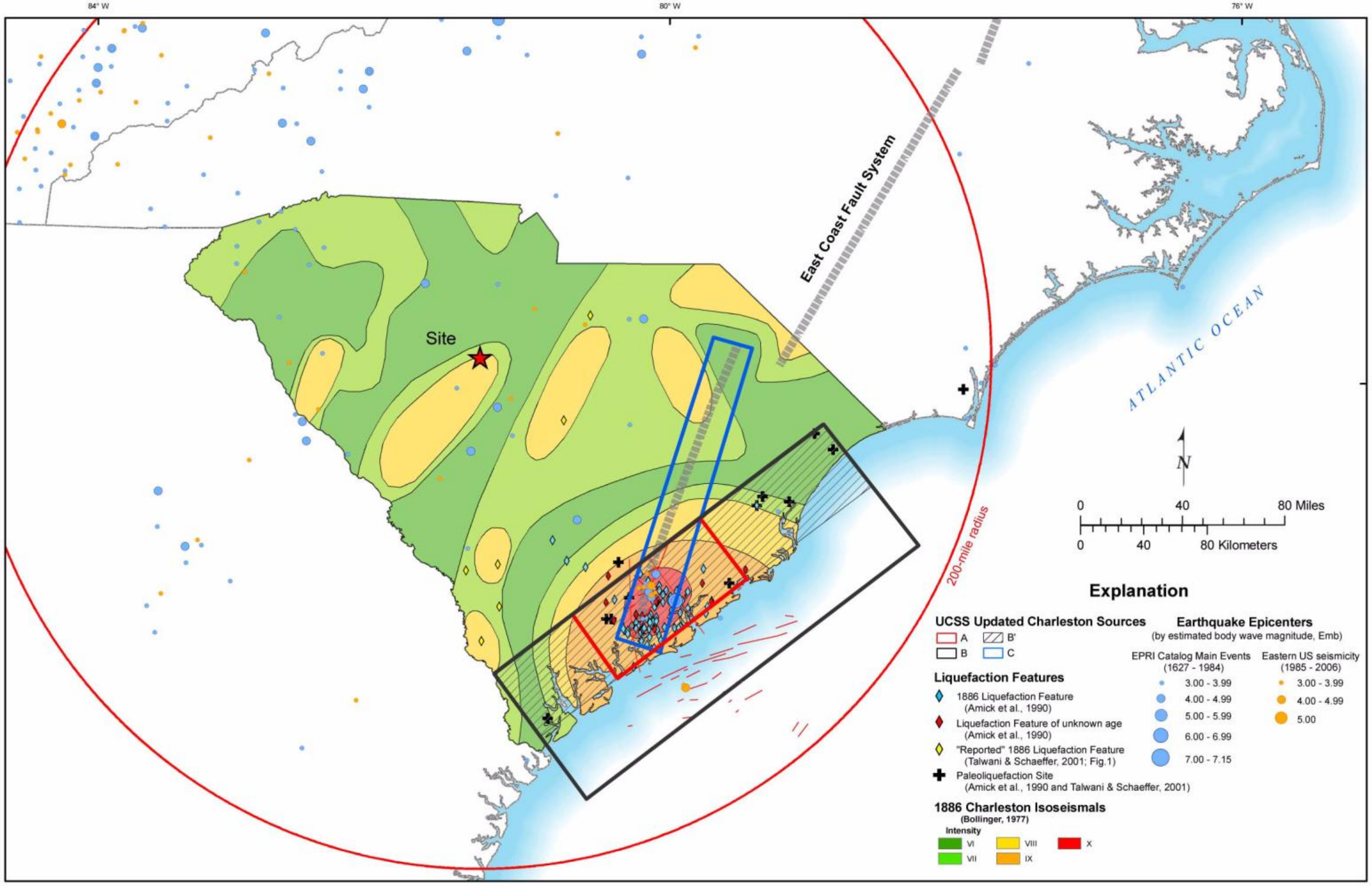
- USGS M_{max} value higher than EPRI values on average for source zones outside Charleston (M=7.5 vs M=6.2*)
- Charleston seismic source models are similar
  - Maximum Magnitudes: M=7.2 (USGS) vs M=7.1* (EPRI)
  - Recurrence Interval: 550 yrs (USGS) vs 630 yrs* (EPRI)
  - Source Geometries

*average value from a distribution

USGS Source Model for Charleston



Updated EPRI Source Model for Charleston



USGS (2008) Seismic Source Model

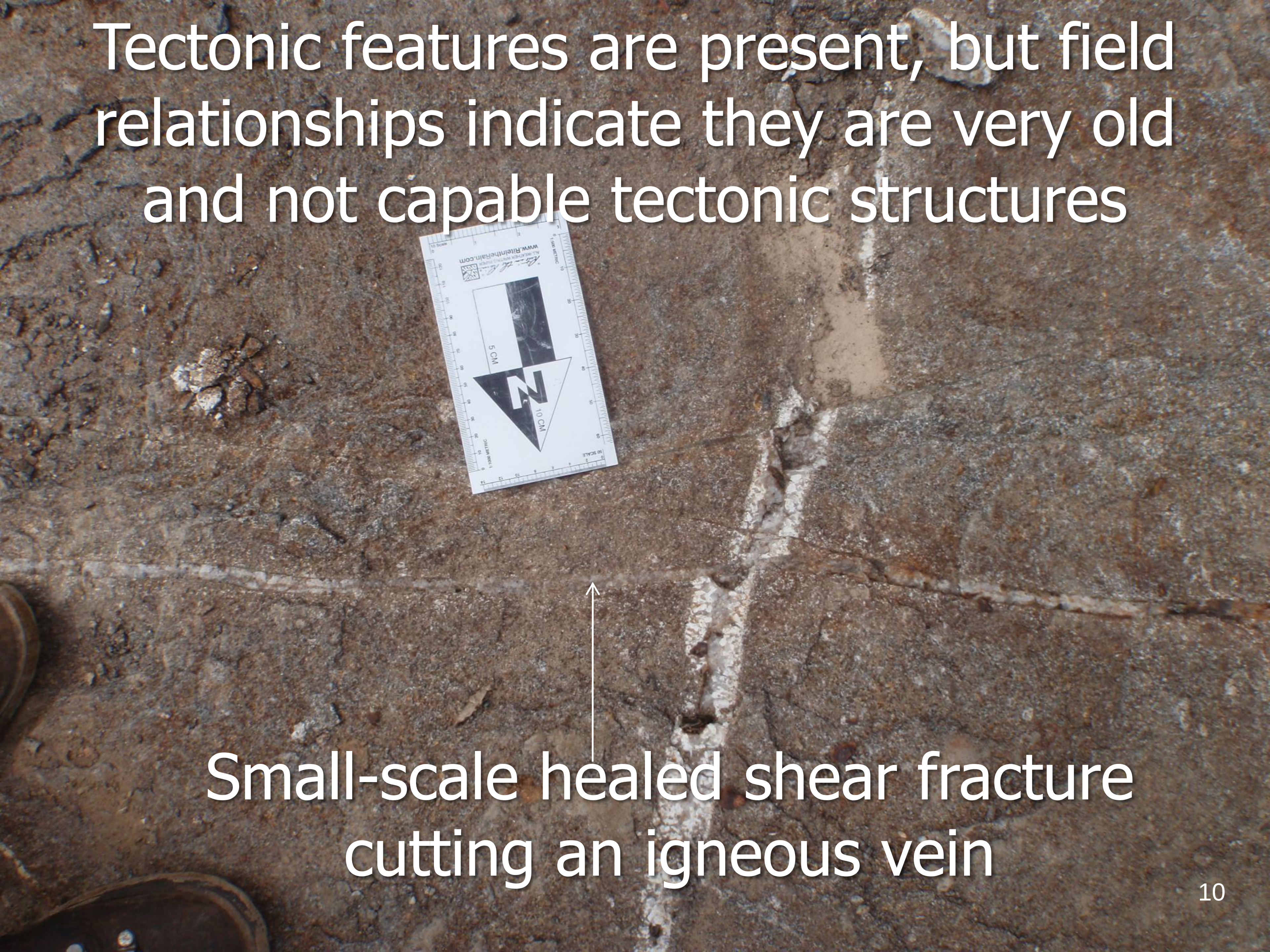
- Applicant compared EPRI seismic source model with USGS (2002) but not USGS (2008) models
- USGS (2008) updates
  - Maximum magnitude distribution replaced single values (M=7.5 vs M=7.1 to M=7.7)
  - Updated ground motion attenuation models
  - Charleston source model enlarged offshore
- Overall USGS (2008) results 10 to 15% lower than USGS (2002) for SE U.S. (USGS OFR 2008-1128)

2.5.1 Basic Geologic and Seismic Information

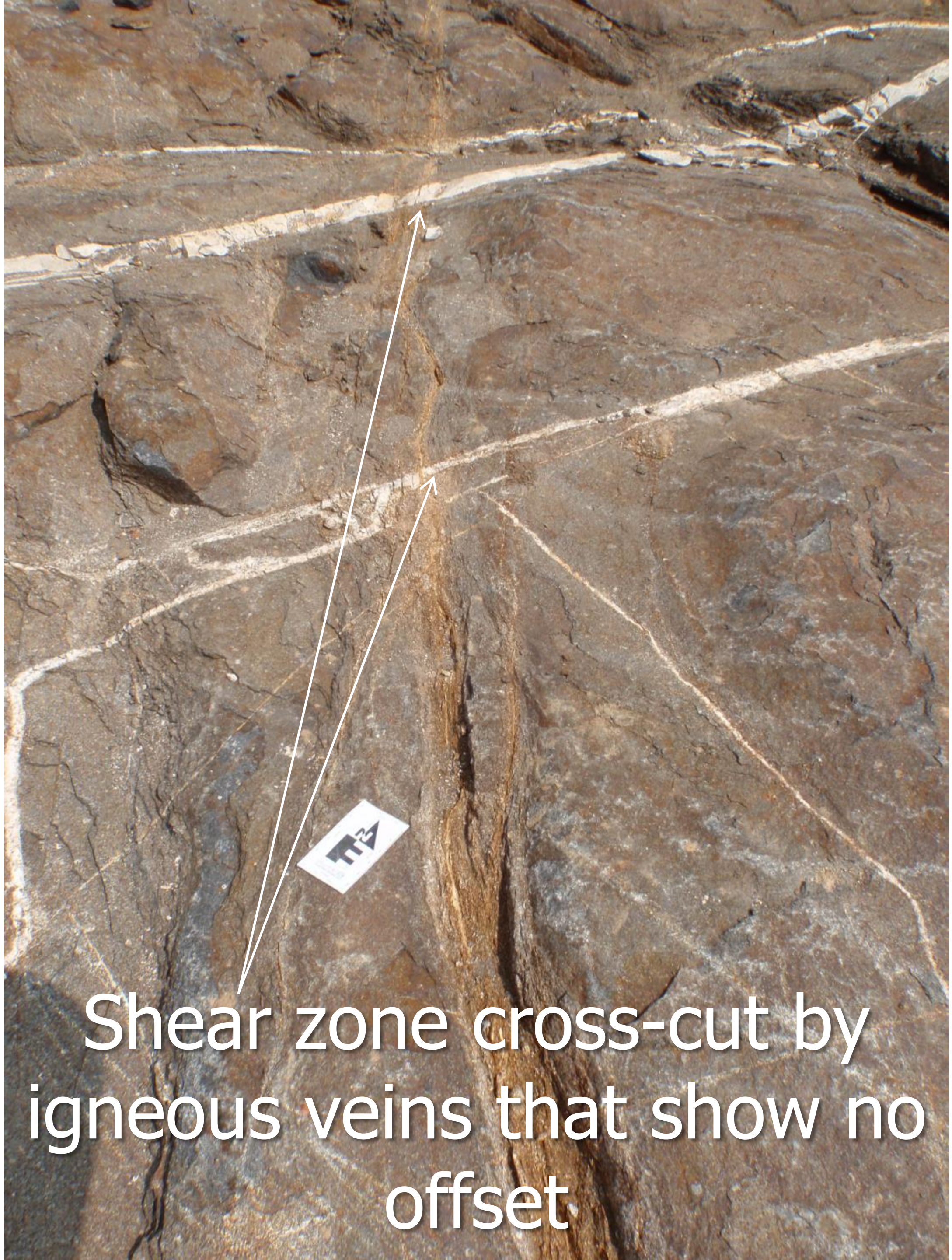
- **Update on observations by NRC geologists on geologic mapping of the Unit 2 excavation to assess the presence of tectonic features**
  - License Condition 2.5.1-1 requires the applicant to perform geologic mapping of excavations for safety-related structures; evaluate geologic features discovered; and notify NRC when excavations are ready for examination.
    - Minor shear zones proven by the applicant to be at least 45 Ma in age were mapped in the Unit 1 excavation, and similar features may occur in the excavations for Units 2 and 3.
  - In August 2010, staff directly examined geologic features being mapped by the applicant in the Unit 2 excavation to ensure that no capable tectonic structures existed therein.

Potential tectonic features were carefully examined by NRC geologists

Tectonic features are present, but field relationships indicate they are very old and not capable tectonic structures



Small-scale healed shear fracture cutting an igneous vein


Shear zone cross-cut by igneous veins that show no offset

2.5.1 Basic Geologic and Seismic Information

- **NRC geologists found that descriptions provided by the applicant in AFSAR Section 2.5 are fully consistent with geologic features observed in the Unit 2 excavation to date.**
  - A follow-up visit to the Unit 2 excavation by NRC geologists and a geotechnical engineer will occur after controlled blasting to reach the foundation level is completed.
  - Similar visits to carefully examine the Unit 3 excavation will also be conducted.

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VC Summer Units 2 and 3 FSAR Chapter 1

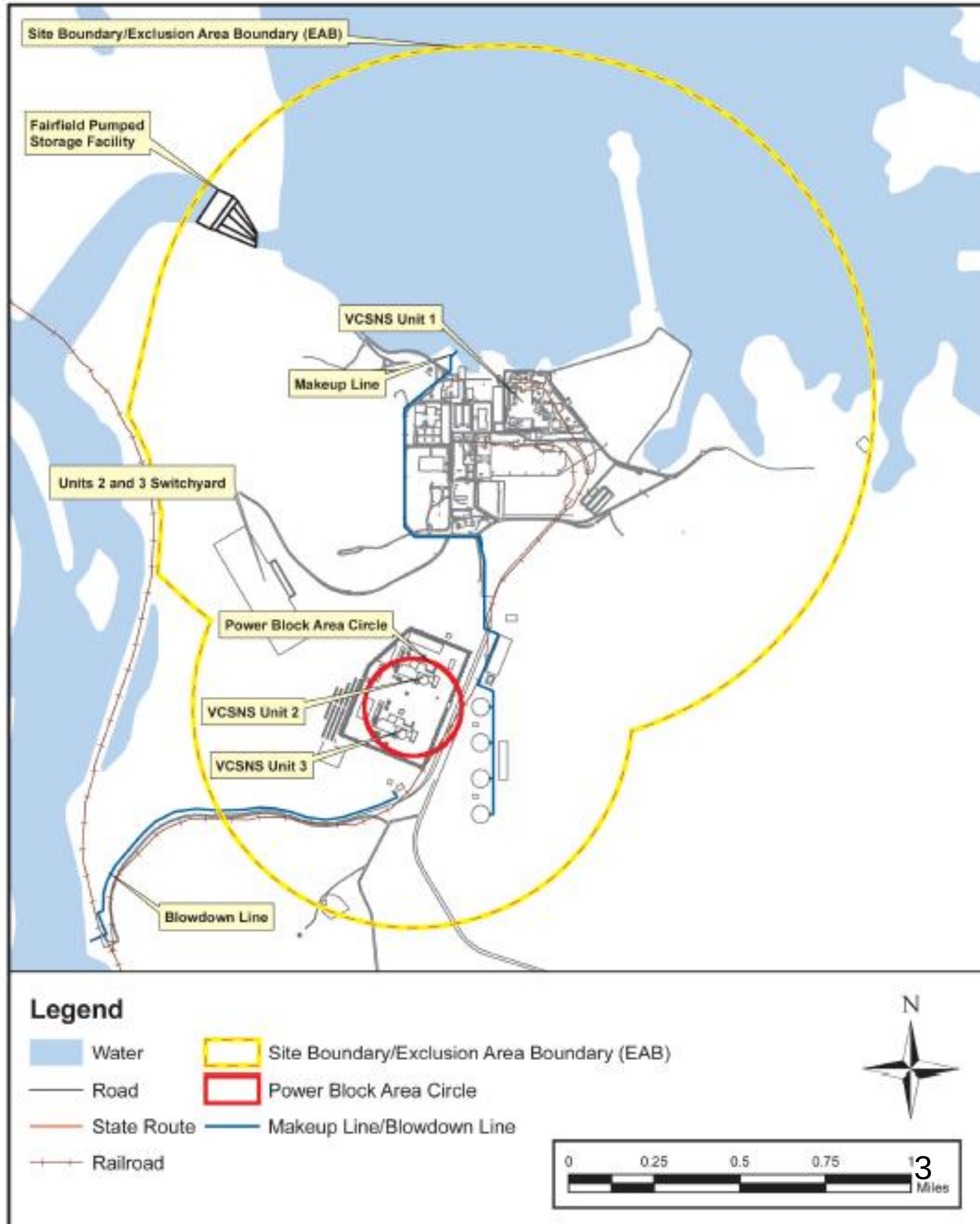
Introduction and Interfaces

Amy M. Monroe – Licensing
New Nuclear Deployment

Chapter 1

- DCD Incorporated by Reference
- Standard material incorporated (including supplements, departures and exemptions)
- Additional site-specific material contained in Sections 1.2, 1.4, 1.8
- Discussion of departures and exemptions

Section 1.2 Site Plan



Section 1.4
Identification of Agents and Contractors

- Co-owned with South Carolina Public Service Authority (Santee Cooper)
- EPC with Consortium – Westinghouse Electric Company and Shaw Group
- Other Technical Support

Section 1.8
Interfaces for Standard Design

- Departures -2 Standard and 3 VCSNS specific
- Exemptions – 2 Standard and 1 VCSNS specific

Questions?

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Presentation to the ACRS Subcommittee

Summer Units 2 and 3 COL Application Review

Overview of Remaining Advanced Safety Evaluation (ASE) Report Chapter and ASE Chapter 1 Introduction and Interfaces

January 10 – 11, 2011

Overview of Remaining Chapters

- ACRS subcommittee meeting in July 2010
  - Discussed chapter 2 without hydrology
- Staff's philosophy for remaining presentations
  - The staff does not intend to brief the ACRS subcommittee on any standard content material.
  - Chapters that will not be presented include the following:
    - Chapter 4, "Reactor"
    - Chapter 7, "Instrumentation and Control"
    - Chapter 14, "Initial Test Program"

Overview of Remaining Chapters

- The staff does intend to provide a high-level description of the site-specific content on a chapter by chapter basis
  - The staff does not intend to brief every site-specific item, rather it intends to brief the ACRS on a subset of those issues, as appropriate.

Staff Review Team

- Technical Staff
  - Aaron Szabo, NRR
- Project Management
  - Joe Sebrosky, Projects

Summer COL Application

- Summer Application consists of:
  - Material incorporated by reference (IBR) from the AP1000 Design Control Document (DCD)
    - Staff's safety evaluation for the AP1000 design certification reflected in NUREG-1793 and its supplement
    - Staff's safety evaluation of AP1000 DC amendment was completed and presented to the committee
  - Standard content material (applicable to all AP1000 COL applicant)
    - Summer's safety evaluation for standard content references Vogtle's advanced safety evaluation report
      - Standard content evaluation material is double indented and italicized
      - Standard content evaluation contains some language from the Bellefonte safety evaluation report with open items to capture evaluations that were performed when Bellefonte was the reference COL
  - Summer plant specific information

Summer COL Overview

Part Number	Description	Evaluation
1	General and Administration Information	Section 1.5.1
2	Final Safety analysis Report	In appropriate SER Chapters
3	Environmental Report	Final Environmental Impact statement
4	Technical Specifications	Chapter 16
5	Emergency Plan	Chapter 13
6	Limited Work Authorization	Not applicable
7	Departure Reports	In appropriate SER Chapters
8	Security Plan	Section 13.6
9	Withheld Information	In appropriate SER Chapters
10	Proposed Combined License Conditions (Including ITAAC)	In appropriate SER Chapters
11	Subsurface report detailing the results of geotechnical exploration	Section 2.5
12	Seismic Technical Advisory Group review letter	Section 2.5
13	Quality Assurance Program Description	Chapter 17
14	Mitigative Strategies Document for loss of large areas of the plant due to explosions or fire	Appendix 19.A
15	Cyber Security Plan	Section 13.8
16	Special Nuclear Material Control and Accounting Program Description	Section 1.5.5

Overview of Summer COL FSAR Chapter 1

FSAR Section	Summary of Departures/Supplements
1.1 Introduction	Incorporated By Reference (IBR) with standard and site specific supplements
1.2 General Plant Description	IBR with site-specific supplements
1.3 Comparisons with Similar Facility designs	Completely IBR
1.4 Identification of Agents and Contactors	IBR with site-specific supplements
1.5 Requirements for Further Technical Information	Completely IBR
1.6 Material Referenced	IBR with standard and site-specific supplements
1.7 Drawings and Other Detailed Information	IBR with site-specific supplements
1.8 Interface for Standard Designs	IBR with site-specific supplements
1.9 Compliance with Regulatory Criteria	IBR with standard and site-specific supplements
1.10 Nuclear Power Plants to be Operated on Multi-Units Sites	Standard and site-specific supplemental information

Technical Topics of Interest

Summer COL Technical Topics of Interest

- Departures and Exemptions
  - **Departures**
    - COL application organization and numbering (Section 1.5.4)
    - COL application organization and numbering for FSAR chapter 2 (Section 2.0)
    - Departure for maximum wet bulb (noncoincident) air temperature (Sections 2.0, 2.3.1, 5.4, 6.2, 6.4, 9.1.3, 9.2.2 and 9.2.7)
    - Emergency response facility locations (Section 13.3)
    - Class 1E voltage regulating transformer current limiting features (Section 8.3.2)
  - **Exemptions**
    - COL application organization and numbering (Section 1.5.4 and 2.0)
    - Exemption from maximum safety wet bulb (noncoincident) air temperature (Section 9.2.2)
    - From requirements of 10 CFR 70.22(b), 70.32(c), and 10 CFR 74.31, 74.41 and 74.51(Section 1.5.4)

Technical Topics of Interest

Other Topics of Interest

- **Financial and Technical qualifications Review**
  - Technical qualification review in accordance with 10 CFR 52.97(a)(1)(iv) ---(Section 1.4.4)
  - Evaluates financial resources to build, operate and eventually decommission a nuclear facility in accordance with 10 CFR 52.79(a)(1)(iv)--(Section 1.5.1)

VC Summer Units 2 and 3
Chapters 5, 6 and 9
Site –Specific Wet Bulb Temperature Exemption

Amy M. Monroe – Licensing

New Nuclear Deployment

Mark Stella - Westinghouse

Basis for Exemption Request

- NRC RAI on site temperature limits generated during COLA review
- 100-year ambient wet bulb return temperature for site determined to exceed DCD maximum safety wet bulb limit
- Several areas potentially affected by the higher wet bulb temperature at the site

Wet-Bulb Temperature Exemption

- Site-specific maximum safety non-coincident wet-bulb temperature was determined to be 87.3ºF (1.2ºF above the AP1000 DCD Tier 1, Chapter 5, Table 5.0-1 value) based on the 100 year return value.

Evaluation of Impacts

- Evaluated AP1000 systems to determine those affected by change in maximum safety wet bulb temperature
- Assessed performance of systems and components affected by quantitative evaluations and calculations
- Performance of systems still acceptable with increased wet bulb temperature

AP1000 DCD Areas Potentially Affected and Outcomes of Assessments

- 6.2.2 – Passive Containment Cooling System Performance – *final pressure increase negligible compared to performance at standard plant limit*
- 5.4.7.1.2.3 – Normal Residual Heat Removal System – In-Containment Refueling Water Storage Tank temperature control - *final IRWST temperature after PRHR initiation increased by several degrees but remained well below boiling*

AP1000 DCD Areas Potentially Affected and Outcomes of Assessments

- 9.2.2.1.2.1 – Component Cooling System – Normal Operation temperature limit – *maximum CCS temperature increased by approximately 2.5 ^oF above nominal design temperature of 95 ^oF – remains below limiting temperature for acceptable RCP cooling*
- 9.2.2.1.2.2 – Component Cooling Water – Normal Plant Cooldown – *no impact as a result of increase in maximum safety wet bulb temperature*

AP1000 DCD Areas Potentially Affected (continued)

- 9.1.3.1.3.1 – Spent Fuel Pool Cooling –Partial Core shuffle (Normal refueling pool temperature control) – *slight increase but SFS pool temperature remains below 120 ^{o}F*
- 9.2.1.2.3.4 – Service Water System – Plant Cooldown/shutdown maximum cooling water temperature at peak heat load - *not affected by increase in maximum safety wet bulb temperature*

AP1000 DCD Areas Potentially Affected (continued)

- 9.2.2.1.2.3 – Component Cooling Water – Refueling (Full Core Offload) - *not affected by increase in maximum safety wet bulb temperature*
- 9.2.7.2.4 – Central Chilled Water System – Normal Operation - *effect of increased wet bulb temperature on MCR cooling, instrument and battery room cooling, and pump room cooling can be accommodated within the available capacity margin of the air-cooled chiller units*

Safety Systems Not Impacted

- Systems affected only by Maximum Safety Dry Bulb Temperature
- Systems whose performance is based on the Maximum Normal Non-coincident Wet Bulb Temperature or on the Coincident Maximum Dry Bulb and Wet Bulb Temperature

Questions?

VCS
V.C. SUMMER
NEW NUCLEAR PROJECT

SCE&G • Santee Cooper
Shaw • Westinghouse Electric Company

VC Summer Units 2 and 3 FSAR Chapters 5, 6 and 9 Additional Information

Amy M. Monroe – Licensing
New Nuclear Deployment

Chapter 5
Reactor Coolant System and Connected Systems

- DCD Incorporated by Reference
- Standard material incorporated
- Site-specific Wet Bulb exemption discussed previously - no additional non-standard information contained in FSAR

Chapter 6
Engineered Safety Features

- DCD Incorporated by Reference
- Standard material incorporated
- Site-specific Wet Bulb exemption (discussed previously)
- All chemical hazard evaluations are discussed in FSAR 2.2.3

Chapter 9
Auxiliary Systems

- DCD Incorporated by Reference
- Standard material incorporated
- Site-specific Wet Bulb exemption (discussed previously)
- Site Specific Systems of Interest

Chapter 9
Auxiliary Systems

- Service Water System Cooling Towers
- Raw Water System has no safety related function and failure of the system will not affect the ability of a safety system to perform its function.

Questions?

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

V. C. Summer Units 2 and 3
COL Application Review

Departure and Exemption for Wet Bulb Non-coincident Temperature

ASE Chapters 5, 6, and 9

Reactor Coolant System and Connected Systems,
Engineered Safety Features, and
Auxiliary Systems

January 10 -11, 2011

Staff Review Team

- Technical Staff
  - Chapter 5, Steam and Power Conversion (Reactor Systems, Nuclear Performance and Code Review Branch)
    - John Budzynski
  - Chapter 6, Engineered Safety Features (Containment & Ventilation Branch)
    - Michelle Hayes
    - Shie-Jeng Peng
  - Chapter 9, Auxiliary Systems (Balance of Plant Branch)
    - Larry Wheeler
    - Raul Hernandez
- Project Managers
  - Joe Sebrosky, Don Habib, Sujata Goetz

Overview of Wet Bulb Departure and Exemption

- Evaluations Affected
  - 5.4.7, Normal residual heat removal system
  - 6.2, Containment systems
  - 6.4, Habitability systems (for main control room)
    - Nuclear island nonradioactive ventilation system (VBS)
    - Low capacity chilled water system (LCCWS)
  - 9.1.3, Spent fuel pool cooling system (SFS) - nonsafety
  - 9.2.2, Component cooling water system (CCS) - RTNSS
  - 9.2.7, Central Chilled Water system (VWS) - nonsafety

- COL Revision 2, maximum safety wet-bulb (noncoincident) air temperature increased from 86.1°F to 87.3°F
  - Based on 100 year return temperature (Chapter 2)

- Maximum coincident wet bulb temperature (86.1°F) and maximum dry bulb temperature (115°F) have not changed from the standard AP1000 values

Section 5.4.7, Normal Heat Removal System (RNS)

- Concern: Impact on the design basis
  - Plant cool-down from 350ºF to 125ºF in 96 hours
  - IRWST temperature
    - <120ºF (normal operation)
    - <boiling (during extended operation)

- The NRC staff concluded that the proposed change in the maximum safety non-coincident wet bulb temperature does not impact the residual heat removal system (RNS) capacity to perform its functions as described in DCD Section 5.4.7.

Section 6.2, Containment Systems

- Will the increased wet-bulb temperature affect the performance of the containment system?

- WGOTHIC analysis demonstrated no impact to peak containment pressure reported in DCD

- Staff CONTAIN analysis confirmed results. Also confirmed no change to air only cooling case.

Section 6.4, Habitability Systems

- **Issue:**
  - Will the higher wet bulb temperature have safety-significant impact on the control room habitability (SRP Sec. 6.4)?

- **Concern:**
  - Maximum safety temperatures ➔ LCCWS ➔ VBS ➔ MCR HVAC
  - SRP 6.4: GDC 4, "Environmental and Dynamic Effects Design Bases"; GDC 19, "Control Room"

Section 6.4, Habitability Systems

- **RAI Response:**
  - Bounded calculation (87.4ºF wet bulb temperature)
  - Design margin

- **Review:**
  - Audit calculation note and conduct public meeting
  - Staff finds that the applicant has provided reasonable assurance that the increase of wet bulb temperature of 1.2ºF would not have safety-significant impact on the control room habitability. Staff concludes from control room habitability aspect that the departure is acceptable.

SFS, CCS, and VWS (Chapter 9, Auxiliary Systems)

- Normal CCS temperature <95ºF with wet bulb 84ºF or lower; as wet bulb temperature increases, CCS temperature increases
- Calculations reviewed by staff at audit
- Same methodology used for Westinghouse TR-36 (wet bulb changes to support AP1000 DCD Revision 16)
- No equipment changes were needed

Section 9.1.3, Spent Fuel Pool Cooling System

- Design parameter SFP < 120°F (AP1000 DCD 9.1.3)
- CCS water temperature rises from 97°F to 97.3°F (Δ0.3°F) due to increase in wet bulb to 87.3°F
- CCS water temperature of 97.3°F, spent fuel pool (SFP) temperature remains below 115°F
- Staff concludes SFP remains within design parameter of <120°F

Section 9.2.2, Component Cooling Water System

- AP1000 DCD Section 9.2.2.1.2.1, normal CCS supply temperature to plant components is not more than 100°F

- Normal CCS water temperature <95°F with wet bulb at 84°F or lower; as wet bulb temperature increases, CCS temperature increases

- CCS water temperature rises from 97°F to 97.3°F (Δ0.3°F) due to increase in wet bulb to 87.3°F

- Higher wet bulb temperature conditions are expected to be of short duration ; periods of <2 hours (estimated to occur 30 hours per year)

Section 9.2.2, Component Cooling Water System (continued)

- Reactor coolant pump motors limited to 100°F for 6 hours
- CCS RTNSS function Mode 5/6 to remove decay heat, significant lower heat loads and no RCPs operating
- Reactor cooling system cooldown uses 80.1°F wet bulb for CCS
- Staff concludes CCS remains within design parameter of < 100°F

Section 9.2.7, Central Chilled Water System (VWS)

- VWS supplies chilled water to various HVAC systems (nonsafety system)
- Two closed loop subsystem
  - High capacity chilled water (HCCWS)
    - Majority of plant HVAC system
      - Radwaste building, control access area, auxiliary building, etc.
  - Low capacity chilled water (LCCWS)
    - Supplies nuclear island nonradioactive ventilation system (VBS)
      - Main Control Room
      - Chemical and volume control system makeup pumps
      - Normal residual heat removal pump compartments unit coolers

Section 9.2.7, Central Chilled Water System (VWS) (continued)

- The VBS is the only HVAC system designed to accommodate the maximum safety temperature limits
- Higher maximum safety ambient wet bulb temperature of 87.3°F can be accommodated within the available capacity margin of the chiller units
- HVAC calculations reviewed by staff at audit, 164 ton load revised to 182 tons; equipment rated at 300 tons – no equipment changes required
- VBS air handling unit has cooling coil and system margin
- Staff concludes VBS has adequate system margins

Staff Conclusions for SFS, CCS, and VWS

- Increasing maximum safety wet-bulb (noncoincident) air temperature from 86.1°F to 87.3°F is acceptable since:

- SFP < 120°F (AP1000 design parameter)

- CCS < 100°F (AP1000 design parameter)

- Existing VBS margin remains adequate

Wet Bulb Exemption

- Exemption requested from 10 CFR Part 52, Appendix D, Section IV.A.2.d related to demonstrating compliance with site parameters

- In order to grant the exemption, the staff determined the following:
  - The exemption does not have an adverse impact on the AP1000 standard plant design and therefore will not result in a significant decrease in safety otherwise provided by the design
  - The exemption is not inconsistent with the Atomic Energy Act or any other statue and therefore is authorized by law
  - Special circumstances are present as specified in 10 CFR 50.12(a)(2).
    - Staff found that special circumstance 10 CFR 50.12(a)(2)(ii) applied, (i.e., application of the regulation is not needed to achieve the underlying purpose of the rule)
  - The special circumstances outweigh any decrease in safety that may result from the reduction in standardization

Summer FSAR Chapter 5

Reactor Coolant System and Connected Systems

FSAR Section	Site-Specific Evaluations
5.2.1.1 Compliance with 10 CFR 50.55a 5.2.1.2 Applicable Code Cases 5.2.1.3 Alternate Classification 5.2.2 Overpressure Protection 5.2.3 Reactor Coolant Pressure Boundary Materials 5.2.4 Inservice Inspection and Testing of Class 1 Components 5.2.5 Detection of Leakage through Reactor Coolant Pressure Boundary 5.3.1 Reactor Vessel Design 5.3.2 Reactor Vessel Materials 5.3.3 Pressure Temperature Limits 5.3.4 Reactor Vessel Integrity 5.3.5 Reactor Vessel Insulation	• None*
5.4 Component and Subsystem Design	• VCS DEP 2.0-2, Maximum Safety Wet Bulb (Noncoincident) Air Temperature

* This section is entirely IBR or IBR/standard.

Summer FSAR Chapter 6

Engineered Safety Features

FSAR Section	Site-Specific Evaluations
6.1.1 Engineered Safety Materials Features, Metallic Materials	• None *
6.1.2 Engineered Safety Materials Features, Organic Materials	• None *
6.2 Containment Systems	• VCS DEP 2.0-2, Maximum Safety Wet Bulb (Noncoincident) Air Temperature
6.3 Passive Core Cooling System	• None *
6.4 Habitability Systems	• ACRS Action Item #63, Staff confirmatory calculation regarding VCS COL 6.4-1, Concentrations of Site-Specific Chemicals • VCS DEP 2.0-2, Maximum Safety Wet Bulb (Noncoincident) Air Temperature
6.5 Fission Product Removal and Control Systems	• None *
6.6 Inservice Inspection of Class 2, 3, and MC Components	• None *

* This section is entirely IBR or IBR/standard.

Summer FSAR Chapter 9

Auxiliary Systems

FSAR Section	Site-Specific Evaluations
9.1.1 New Fuel Storage	• None*
9.1.2 Spent Fuel Storage	• None*
9.1.3 Spent Fuel Pool Cooling System	• VCS DEP 2.0-2, Maximum Safety Wet Bulb (Noncoincident) Air Temperature
9.1.4 Light Load Handling System	• None*
9.1.5 Overhead Heavy Load Handling Systems	• None*
9.2.1 Service Water System	• VCS SUP 9.2-3 provides additional information regarding the service water system cooling tower potential interactions
9.2.2 Component Cooling Water System	• VCS DEP 2.0-2, Maximum Safety Wet Bulb (Noncoincident) Air Temperature
9.2.3 Demineralized Water Treatment System	• None*
9.2.4 Demineralized Water Transfer and Storage System	• None*

* This section is entirely IBR or IBR/standard.

Summer FSAR Chapter 9

Auxiliary Systems

FSAR Section	Site-Specific Evaluations
9.2.5 Potable Water System	• VCS COL 9.2-1, Potable water system description outside the power block
9.2.6 Sanitary Drains	• VCS SUP 9.2-1, Sanitary waste system discharge description
9.2.7 Central Chilled Water System	• VCS DEP 2.0-2, Maximum Safety Wet Bulb (Noncoincident) Air Temperature
9.2.8 Turbine Building Closed Cooling Water System (TCS)	• VCS CDI provides the source of cooling water for the TCS heat exchangers
9.2.9 Waste Water System	• VCS COL 9.2-2 provides information on the waste water retention basins and associated discharge piping
9.2.10 Hot Water Heating System	• None*
9.2.11 Raw Water System	• VCS SUP 9.2-2 provides site-specific information related to the raw water system
9.3.1 Compressed and Instrument Air System	• None*
9.3.2 Plant Gas System	• None*

* This section is entirely IBR or IBR/standard.

Summer FSAR Chapter 9

Auxiliary Systems

FSAR Section	Site-Specific Evaluations
9.3.3 Primary Sampling System	• None*
9.3.4 Secondary Sampling System	• None*
9.3.5 Equipment and Floor Drainage Systems	• None*
9.3.6 Chemical and Volume Control System	• None*
9.4.1 Nuclear Island Nonradioactive Ventilation System	• VCS COL 9.4-1b provides local toxic gas evaluations
9.4.2 Annex/Auxiliary Buildings Nonradioactive HVAC System	• None*
9.4.6 Containment Recirculation Cooling System	• None*
9.4.7 Containment Air Filtration System	• None*
9.4.8 Radwaste Building HVAC System	• None*

* This section is entirely IBR or IBR/standard.

Summer FSAR Chapter 9

Auxiliary Systems

FSAR Section	Site-Specific Evaluations
9.4.9 Turbine Building Ventilation System	• None*
9.4.10 Diesel Geneartor Building Heating and Ventilation System	• None*
9.4.11 Health Physics and Hot Machine Shop HVAC System	• None*
9.5.1 Fire Protection System	• VCS COL 9.5-1, qualification requirements for the fire protection program • VCS COL 9.5-2, site-specific hazards analysis of the yard areas and outlying buildings
9.5.2 Communication System	• VCS COL 9.5-9, offsite interfaces • VCS COL 9.5-10, emergency offsite communications • VCD COL 9.5-11, security communications
9.5.3–9.58	• None*

* This section is entirely IBR or IBR/standard.

RWS Description

- **RWS is non-safety and non-RTNSS**

- **Raw water intake structure includes 3 non-safety pumps which pumps unfiltered water from the Monticello Reservoir to:**
  - CWS cooling towers
  - Alternate water for the SWS cooling towers via cross connect from water treatment header

- **Nearby offsite water treatment facility provides filtered water to:**
  - Demineralized water treatment system
  - Fire protection
  - Normal makeup to SWS cooling towers
  - Other misc users such as condenser vacuum pump seal water heat exchanger and TBCCW heat exchanger cooling

RWS Description

- **RWS is a shared system for Unit 2 & 3 which includes:**
  - Offsite water treatment ~ 1000 gpm
  - 400,000 acre-feet of reservoir (adequate to support 7 days of CDS operations)
  - 3 -50% capacity raw water pumps to support normal CWS makeup (alternate to SWS)
  - 2- 100% capacity screen wash pumps
  - 2 of the 3 raw water pumps and discharge valves are diesel backed
  - Traveling screens and screen wash pumps are diesel backed
  - HDPE underground piping materials

Staff Review Summary

- RWS has redundancy with RWS pumps to support CSD
- Reliable materials are being utilized consistent with industry good practices
- RWS is non radioactive and contamination is not credible due to its configuration relative to potential sources of contamination

Staff Review Summary

- **GDC 2 and GDC 4 have been satisfied**
  - Failure of the RWS/components will not affect the ability of any risk-significant systems to perform their intended safety functions
  - Failure of the RWS/components will not affect any RTNSS

- **Staff concludes that RWS:**
  - Meets all applicable regulations
  - Considered highly reliable to support CSD

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VC Summer Units 2 and 3 FSAR Chapters 3 and 19

Amy M. Monroe – Licensing
New Nuclear Deployment

Chapter 3
Design of Structures, Components, Equipment and Systems

- DCD Incorporated by Reference
- Standard material incorporated
- Site-specific supplements
  - 3.3 - Wind and Tornado Loadings
  - 3.4 – Flooding
  - 3.5 - Turbine Missiles
  - 3.7 – Seismic Design
  - 3.8 – Waterproofing Material

Chapter 19
Probabilistic Risk Assessment

- DCD Incorporated by Reference
- Standard material incorporated
- Site-specific external events evaluation

Section 19.58
External Events

- Winds
- Floods
- Transportation and Nearby Facility Accidents
- Fires

Questions?

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

Virgil C. Summer Units 2 and 3 COL Application Review

ASE Chapters 3 and 19

Design of Structures, Components, Equipment and Systems, and Probabilistic Risk Assessment

January 10–11, 2011

Staff Review Team

- **Technical Staff**

  Chapter 3

  – Bret Tegeler, Structural Engineering Branch

  – Vaughn Thomas, Structural Engineering Branch

  Chapter 19

  – Malcolm Patterson, PRA and Severe Accidents Branch

- **Project Managers**

  – Tom Galletta, chapter 19

  – Terri Spicher, chapter 3

Summer FSAR Chapter 3

Design of Structures, Components, Equipment and Systems

FSAR Section	Site-Specific Evaluations
3.1 Conformance With Nuclear Regulatory Commission General Design Criteria	• None*
3.2 Classification of Structures, Components, and Systems	• None*
3.3 Wind and Tornado Loadings	• VCS COL 3.3-1 Wind Velocity Characteristics • VCS COL 3.5-1 Tornado Velocity Characteristics
3.4 Water Level (Flood) Design	• VCS COL 3.4-1 Dewatering System and Water Levels
3.5 Missile Protection	• VCS SUP 3.5-1 Turbine Missile from Unit 1

* This section is entirely IBR or IBR/standard

Summer FSAR Chapter 3

Design of Structures, Components, Equipment and Systems

FSAR Section	Site-Specific Evaluations
3.6 Protection Against the Dynamic Effects Associated With the Postulated Rupture of Piping	• None*
3.7 Seismic Design	• VCS SUP 3.7-3 Design Ground Motion Response Spectra • VCS COL 3.7-1 Seismic Analysis of Dams
3.8 Design of Category I Structures	• VCS COL 2.5-17 Waterproofing Material for Category I Structures
3.9 Mechanical Systems and Components	• None*
3.10 Seismic and Dynamic Qualification of Seismic Category I Mechanical and Electrical Equipment	• None*
3.11 Environmental Qualification of Mechanical and Electrical Equipment	• None*

* This section is entirely IBR or IBR/standard.

Summer FSAR Chapter 19

Probabilistic Risk Assessment

FSAR Section	Site-Specific Evaluations
19.1–19.54, 19.56, 19.57	• None*
19.55 Seismic Margins Analysis	• VCS SUP 19.59.10-6 Site-Specific Seismic Margin Analysis
19.58 Winds, Floods, and Other External Events	• VCS SUP 19.58-1 External Event Frequencies
19.59 PRA Results and Insights	• None*

* This section is entirely IBR or IBR/Standard

VCS SUP 3.7-3 and SUP 19.59.10-6
Design Ground Motion Response Spectra

- Issue
  - COL applicant to provide a comparison of the site-specific ground motion response spectra (GMRS) to the hard rock high frequency (HRHF) spectra and Certified Seismic Design Response Spectra (CSDRS).
  - Site specific horizontal and vertical GMRS exceeds the standard AP1000 CSDRS at high frequencies; however, it is entirely bounded by the AP1000 HRHF spectra.
- Resolution
  - The staff concludes the high frequency seismic input was evaluated in the AP1000 DCD and considered to be non-damaging.

VCSNS GMRS vs. CSDRS

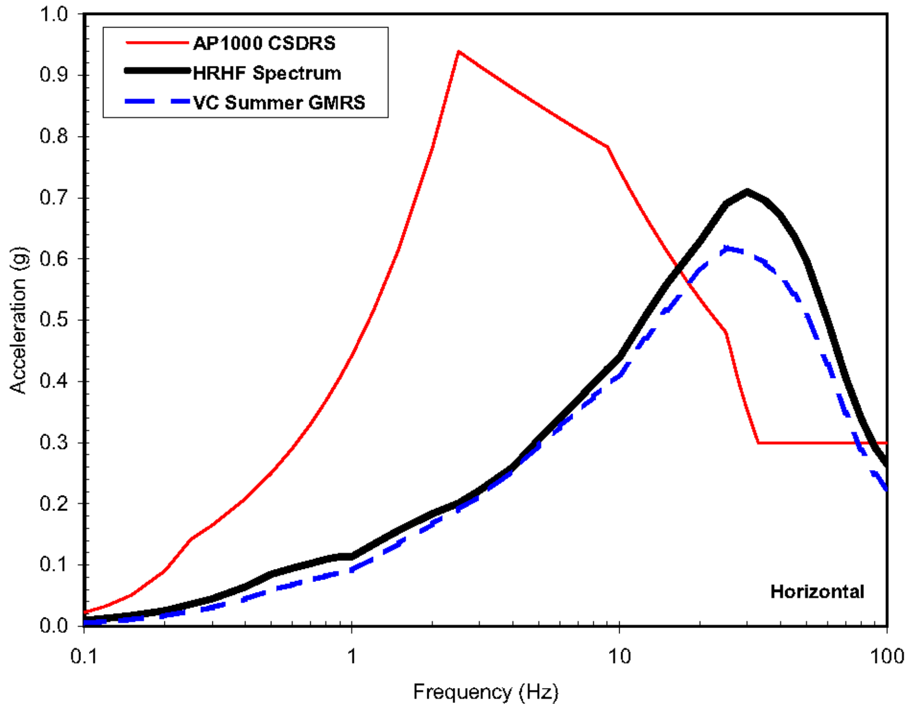


Figure 2.0-201. Comparison Plot of V. C. Summer GMRS and HRHF Spectra for the Horizontal Component of Motion

Technical Topics of Interest for VCS

- Issue
  - COL applicant to provide a summary of external events to confirm the basis for concluding that the VCS site was bounded by the generic AP1000 analysis.

- Resolution
  - Based on the parameters of the VCS site, provided in a plant-specific supplement, the staff confirmed that all external events that should be assessed may be screened from further evaluation. The staff concludes that the incorporation of AP1000 DCD Section 19.58 by reference is acceptable.

V.C. Summer External Events

External Event	Screening Criteria Applied			
	Bounded	Negligible Frequency	Negligible Consequence	Not Applicable
Tornado	•			
Hurricane	•		•[1]	
External flood				PMP flood < 100' (grade)
Aviation		•		
Marine				No barge traffic
Pipeline	•			Nearest pipeline >1 mi.
Railroad			•	$D_{closest\ track} > D_{standoff}$
Truck	•			
Nearby facilities			•[2]	
External fires			•[2]	

[1] Extratropical cyclones
[2] Confirmatory items

VC Summer Units 2 and 3 FSAR Chapters 8 and 10

James LaBorde – Consulting Engineer
New Nuclear Deployment
Amy M. Monroe – Licensing
New Nuclear Deployment

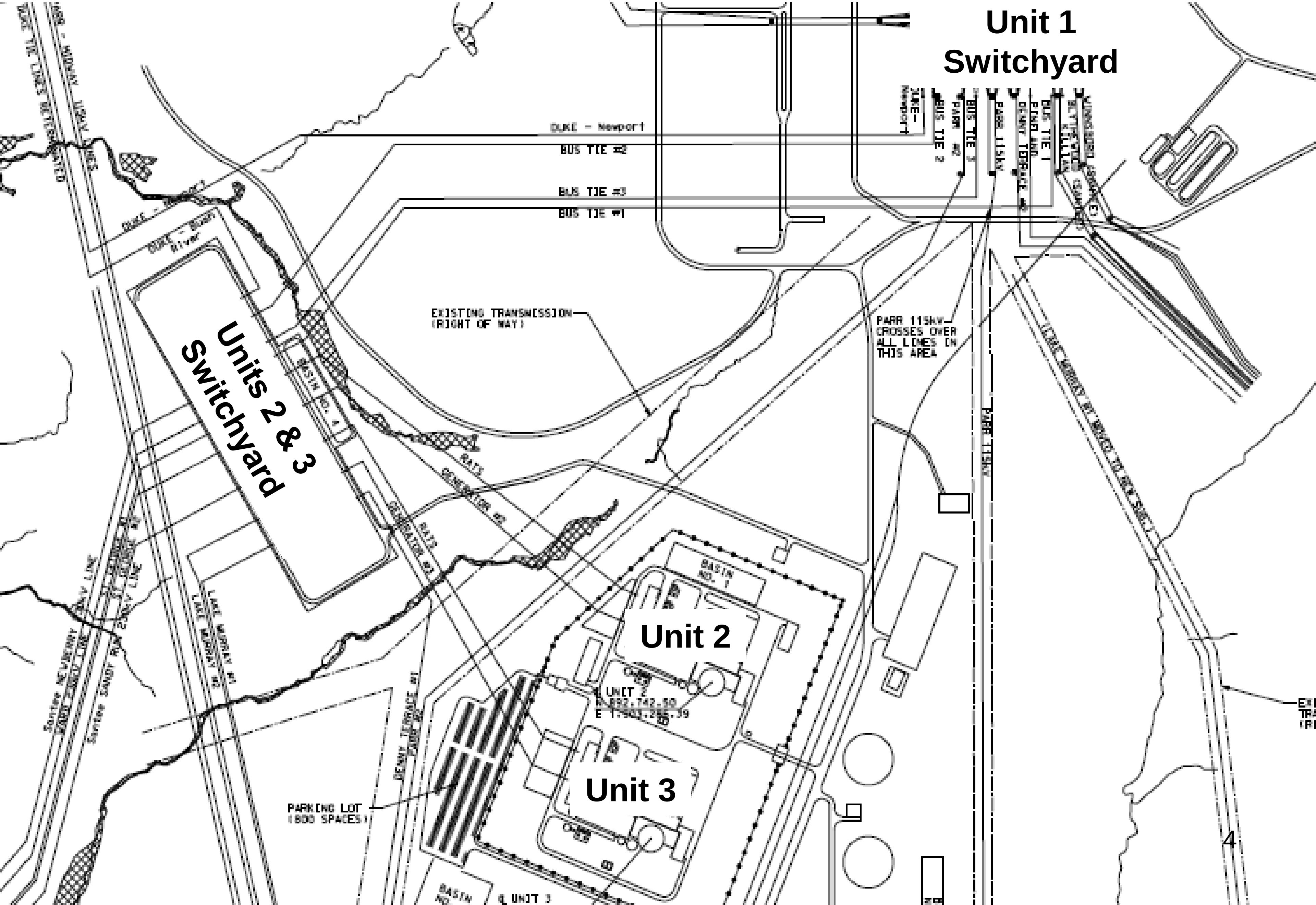
Chapter 8
Electric Systems

- DCD Incorporated by Reference
- Standard material incorporated (including standard departure)
- Site-specific off-site power description

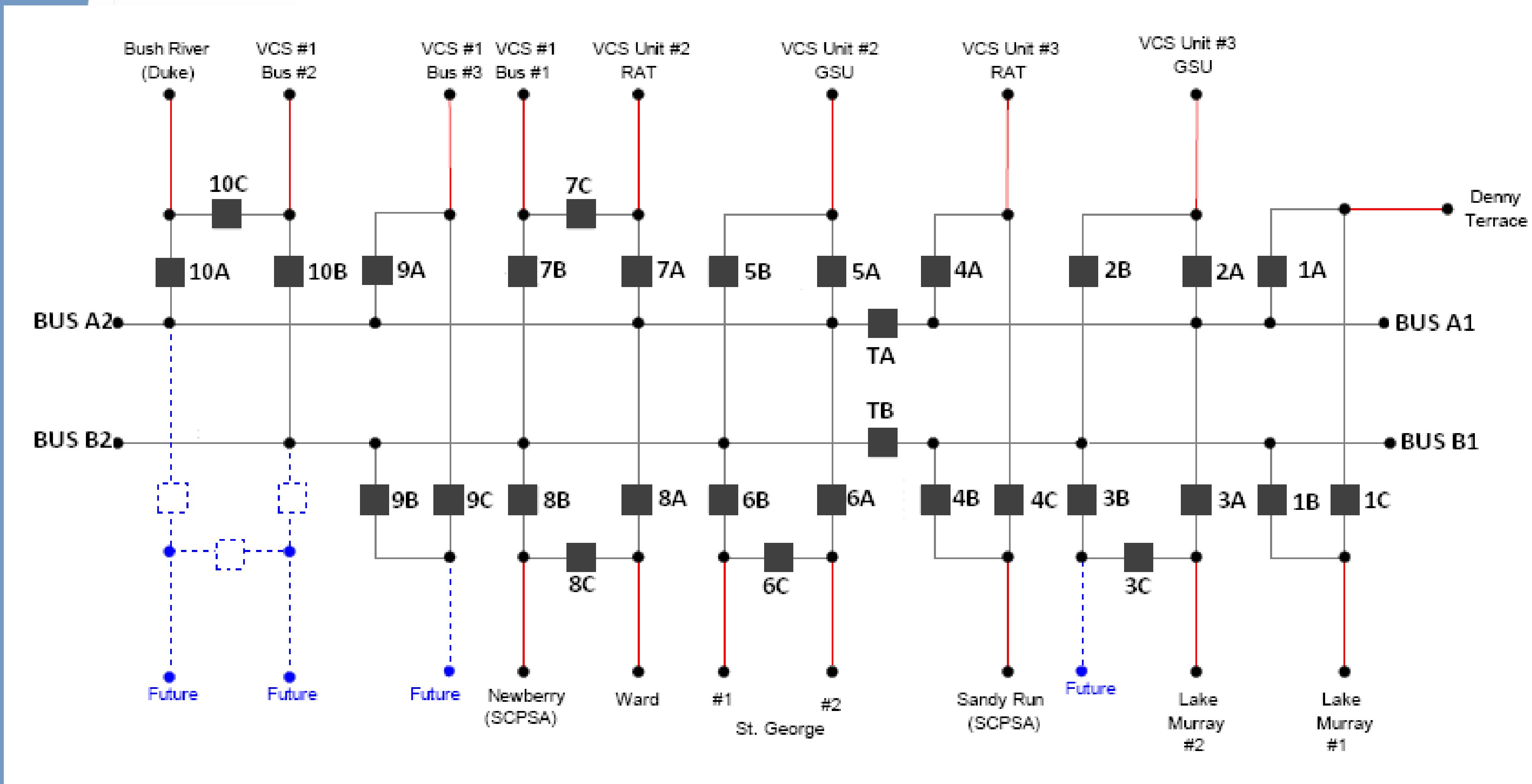
Section 8.2
Offsite Power

- 12 overhead transmission lines connect the new 230 kv switchyard to other substations
- Switchyard is robust
- Failure Analysis performed
- Grid Stability Study performed
  - Includes the Westinghouse interface requirement for maintaining Reactor Coolant Pump voltage for 3 seconds after a turbine trip

Units 1, 2, & 3 Transmission Lines



Switchyard Single-line Diagram



Questions?

Chapter 10
Steam and Power Conversion

- DCD Incorporated by Reference
- Standard material incorporated
- Site-specific discussions of interest
  - Circulating Water System (CWS) – Serves no safety-related function but is a heat sink for waste heat from the turbine discharge to the main condenser

Circulating Water System Pipe

Facts:

10’ Diameter, 16’ Length, Weighs 64,000lbs

Questions?

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

V. C. Summer Units 2 and 3 COL Application

ASE Chapters 8 and 10

Electric Power

Steam and Power Conversion

January 10-11, 2010

Staff Review Team

- Technical Staff
  - **Tania Martinez Navedo,** Electrical Engineer
  - **Om Chopra,** Electrical Engineer
- Project Manager
  - Joe Sebrosky

Summer FSAR Chapter 8

Electric Power

FSAR Section	Site-Specific Evaluations
8.1 Introduction	• VCS SUP 8.1-1 Summer Units 2 and 3 connection to the utility grid • VCS SUP 8.1-2 Additional information on regulatory guidelines and standards
8.2 Offsite Power System	• VCS COL 8.2-1 Transmission system description, and its testing and inspection plan • VCS COL 8.2-2 Switchyard description and protection relaying • VCS SUP 8.2-1 FMEA of the switchyard • VCS SUP 8.2-2 Transmission system requirements and studies • VCS SUP 8.2-3 Transmission system planning • VCS SUP 8.2-4 Stability and reliability of the offsite transmission power system • Interface Requirements
	• VCS Conceptual Design Information (CDI) describing the transformer area located next to each unit's turbine building

Summer FSAR Chapter 8

Electric Power

FSAR Section	Site-Specific Evaluations
8.3.1 AC Power Systems (Onsite)	• VCS COL 8.3-1 Grounding system and lightning protection • VCS SUP 8.3-1 Site-specific switchyard and power transformer voltage • VCS SUP 8.3-2 EDG rating based on site conditions
8.3.2 DC Power Systems (Onsite)	• None*

*This section is entirely IBR or IBR/Standard

Staff Review Summary

- **Section 8.1 – Introduction**
  - Applicant has adequately addressed VCS SUP 8.1-1 regarding V.C. Summer 2 and 3 Units' connection to the South Carolina Electric and Gas transmission system.
  - The applicant has adequately addressed VCS SUP 8.1-2 regarding additional information for regulatory guidelines and standards.

Staff Review Summary

- **Section 8.2 – Offsite Power System**
  - The staff finds COL information items VCS COL 8.2-1 involving the design details of the plant site switchyard and its interface with the local transmission grid adequately addressed pending closure of Confirmatory Item 8.2-1**.**
    - Confirmatory Item 8.2-1 relates to FSAR changes addressing interface items
  - The staff concludes that the applicant's condition monitoring program for underground or inaccessible cables satisfies the recommendations of GL 2007-01,and the guidance in NUREG/CR-7000 and NUREG-0800 pending closure of Confirmatory Item 8.2-3.

Staff Review Summary

- **Section 8.2 – Offsite Power System**
  - The applicant has adequately addressed VCS SUP 8.2-1 thru 8.2-4 involving the offsite power system adequacy and availability, testing and inspection of switchyard components and failure modes and effects analysis.
  - The applicant provided sufficient information regarding the interfaces for standard design from the generic AP1000 DCD, Table 1.8-1, Items 8.1, 8.2, and 8.3.

Staff Review Summary

- **Section 8.3.1 – AC Power System (Onsite)**
  - The applicant has adequately addressed VCS SUP 8.3-1 involving the site-specific switchyard and transformer voltage.
  - The applicant has adequately addressed VCS SUP 8.3-2 involving the site-specific conditions bounded by the standard site conditions in the AP1000 DCD for rating the diesel generator.

Summer FSAR Chapter 10

Steam and Power Conversion

FSAR Section	Site-Specific Evaluations
10.1 Summary Description	• None*
10.2 Turbine Generator	• None*
10.3 Main Steam Supply System	• None*
10.4 Other Features of Steam and Power Conversion System	• VCS CDI, relating to COL Section 10.4.2 for the site specific cooling water source for the vacuum pump seal water heat exchangers. • VCS CDI, relating COL Section 10.4.5 for the site specific Circulating Water System design information. • VCS COL 10.4-1 relating to the Circulating Water System design parameters. • VCS COL 10.4-2 relating to Condensate, Feedwater and Auxiliary Steam System Chemistry Control.

* This section is entirely IBR or IBR/standard.