Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Meeting of the AP1000 Subcommittee

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Wednesday, July 23, 2009

Work Order No.: NRC-2982 Pages 1-343

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UNITED STATES NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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AP1000 SUBCOMMITTEE

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THURSDAY

JULY 23, 2009

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The Subcommittee convened, at 8:30 a.m., in room T2-B3, at Nuclear Regulator Commission Headquarters, 11545 Rockville Pike, Rockville, Maryland, Harold B. Ray, Chair, presiding.

SUBCOMMITTEE MEMBERS PRESENT:

HAROLD B. RAY, Chair
SANJOY BANERJEE
SAID ABDEL-KHALIK
CHARLES H. BROWN, JR.

CONSULTANTS TO THE SUBCOMMITTEE PRESENT:

THOMAS S. KRESS

NRC STAFF PRESENT:

MICHAEL LEE, Designated Federal Official
STEPHANIE COFFIN
EILEEN McKENNA
FRANK AKSTULEWISZ
RAVI JOSHI
JOE SEBROSKY
SERITA SANDERS
ERIC OESTERLE
PERRY BUCKBERG
DAVID TERAO
NEIL RAY
GENE HSII
DEVENDER REDDY
KEN MOTT
GREG MAKAR
SUJATA GOETZ
JIM TATUM
STEVE SCHAFFER
ED ROACH

ALSO PRESENT:

JACK BAILEY
ED CUMMINS
ANDREA STERDIS
ROB SISK
EDDIE GRANT
JOHN DEBLASIO
DALE WISEMAN
KEITH SCHWAB
BILL PANTIS
TOM SPINK
TOM RAY
TIM MENEELEY
AMY AUGHTMAN
WILLIAM SMITH

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8:29 a.m.

CHAIR RAY: (presiding) We will come to order, please.

This is the first day of the meeting of the AP1000 Reactor Subcommittee, a standing subcommittee of the Advisory Committee on Reactor Safeguards, or ACRS.

I am Harold Ray, Chairman of this Subcommittee. Other members in attendance are Said Abdel-Khalik, Sanjoy Banerjee, Charles Brown, Jr., and Tom Kress.

Tom is an emeritus member of the ACRS and a former Committee Chairman, and is seated here at the table with us today. We appreciate his being available to us.

Mike Lee, of the ACRS staff, is the Designated Federal Official for the meeting.

The purpose of this Subcommittee meeting over the next two years will be to commence the reviews and discussions concerning Revision 17 to the Design Control Document, or DCD, describing the standard plant design of the AP1000 Pressurized Water Reactor.

In January 2009, the Westinghouse Electric Company submitted Revision 17 of the DCD to the U.S. Regulatory Commission. Since then, the staff in the Office of New Reactor Licensing have been engaged in review of those revisions and have completed this review with meetings with Westinghouse representatives and members of the AP1000 Design Center Group.

Upon completion of this review, the staff will issue a final Safety Evaluation Report related to the certification of the Revised Standard Design. As part of the design certification process, the NRC staff are required to obtain the views of the ACRS. Today and in subsequent meetings, the Subcommittee will hear from the staff on the results of their DCD review.

In parallel with the DCD certification review, the staff are also in process of reviewing the Combined Operating License Application, or COLA, for two AP1000-type reactors at the former Bellefonte reactor site in Jackson County, Alabama.

In October 2007, the Tennessee Valley Authority and the Multi-Utility Consortium Nustart Energy submitted a COLA for two AP1000 reactors

designated Units 3 and 4 at the Bellefonte site. TVA has selected the Bellefonte site as the reference application, or R-COLA, for the operation of other Westinghouse AP1000 reactors by other utilities.

Since then, the NRC staff have been engaged in the review of TVA's final Safety Analysis Report, submitted as part of the R-COLA, and have prepared Draft Safety Evaluation Reports with open items on selected chapters of the Combined License Application.

As part of the review process, the staff are also required to obtain the views of the ACRS before an Operating License can be approved. Today and in subsequent meetings, the Subcommittee will also hear from the staff on the results of their R-COLA reviews.

And I'll digress for a moment and say that there has been some experience, I think, with another subcommittee as well in which the information that is applicable from the DCD to the R-COLA will be presented here in a way that we may want to comment on as we go forward to make most efficient use of our time, so that we're focusing on the things that are different in the R-COLA and should, therefore, have

our attention emphasized. We will address that as we get into it rather than trying to fix any rules here now.

I understand the copies of the detailed meeting agenda have been made available. In that regard, I will again digress and say that I am honored to be among members of the Committee who have been entitled to carry the title "doctor"; however, I am not. So the agenda is incorrect in that regard. I'm merely Mr. Ray or Member Ray.

(Laughter.)

In looking at the agenda, you will see that for each chapter a standard briefing template will be followed that consists of essentially four elements.

One, a discussion of the Revision 17 changes to the DCD and the significance of those changes over the NRC-certified Revision 15.

A discussion of the site-specific FSAR corresponding to the DCD chapter just described.

A discussion of the proposed Safety Evaluation Report derived following the review of the R-COLA, which is pertinent to the comment I made earlier.

And a discussion of applicable open items.

Individuals representing the NRC staff, Westinghouse, TVA, and NuStart will lead these discussions as appropriate, and that is described in the agenda.

In summary, the Subcommittee intends to gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate from this meeting for deliberation by the full Committee of the ACRS at a later date.

I will note that there has been an indication by the staff that interim letters may be desired. We will, of course, have to discuss that further and with the full Committee.

They also determined that additional meetings on one or more of the items discussed over the next two days merits additional study by the Committee, by this Subcommittee.

The rules for participation in today's meeting have been announced as part of the notice of the meeting previously published in The Federal Register. I believe we have received no written comments or requests for time to make oral statements

from interested members of the public regarding the subject of today's meeting.

I understand we have the speakerphone in operation, and we have some subject matter experts who may be called upon over that line. We ask that those individuals participating in the Subcommittee meeting over the telephone bridge lines place their speakerphones on mute.

As stated in our earlier Federal Register notice, a transcript of this meeting is being prepared and will be made publicly available in the near future on the ACRS website.

Therefore, we request that anyone wishing to address the Subcommittee use one of the microphones located throughout this meeting room. We request that you first identify yourself and your affiliation and you speak with sufficient clarity and volume, so that your comments may be readily heard and recorded.

We also request that, if you are in possession of cell phones or some type of electronic paging device, you adjust it to silent mode or turn it off, so as not to interrupt the meeting.

Now, having said all this, we can now

proceed with the meeting. But, first, I understand that Frank Akstulewisz, a Deputy Director of the NRO's Division of New Reactor Licensing, will make an opening statement.

MR. AKSTULEWISZ: Thank you, Mr. Chairman.

I appreciate the Committee meeting with us over the next couple of days. I was going to restate some of the points that you have made, but you have made them so eloquently I'm not going to restate them, in the interest of time.

But I do want to mention two things. One is not only is this a significant milestone in the progress of this review, it does establish the transition point for the R-COLA specifically, that we will be moving from Bellefonte to Vogtle for the completion of those activities as these reviews progress.

Second, I want to echo your concerns about effective use of time. I think if there are ways that the Committee can help the staff, help the Committee in getting through the tremendous amount of information, we are certainly open to those suggestions about how to more effectively use the

Committee's time and still be successful at our responsibilities to meet with each other.

So, with that, I will turn it over to Stephanie or Eileen.

CHAIR RAY: Frank, before you do, excuse me. Could you comment a little further on this transition from Bellefonte to Vogtle? How will it appear to us?

MS. COFFIN: I actually have a particular slide in my presentation. So if you don't mind waiting, I can talk to that.

CHAIR RAY: Sure. All right.

MR. AKSTULEWISZ: I will let Stephanie take it.

CHAIR RAY: Okay, fine. Go ahead.

MS. COFFIN: Ed or Jack, would you like to make opening comments?

MR. BAILEY: Sure. I will be very brief here.

One, we are appreciative of the Committee and the staff for allowing --

MS. COFFIN: You need to introduce yourself, Jack.

MR. BAILEY: Oh, I'm sorry. I'm Jack

Bailey. I'm the Vice President of Nuclear Generation Development for TVA.

I'm listed as a presenter, but my presentation is this part, and it is going to be fairly short unless particular questions come up where I need to contribute a response.

We are appreciative of the Committee and the staff for finding a way to break up the review of our lengthy application into parts, this being the first part of three that we expect throughout this year. We think it is a very effective way for us to sufficiently review the detail we need to and yet do it in a timely fashion as the information is ready. So we appreciate and thank you for that.

The second thing is I think this, to our understanding, is unique. In the introductory of a meeting we had a short while back, we talked about the fact that this was multiple utilities, NuStart organization coordinating that activity, and an applicant, all working together to standardize most of the content of a COL application.

In addition to that, in this meeting today we also have the vendor and the DCD information being provided in parallel. I'm sure we will hear

more about that going through, but, to our knowledge, the previous types of discussions the ACRS has had to hear have not had the opportunity to combine all of it in such a way and, as you said, lay the foundation for future applications that are going to come in and use that same information in the same way.

So that sometimes causes confusion because it is unique, but it has actually worked extremely well, and the utilities that have been working on this process have worked for a long time to ensure that we standardize this content as much as possible.

The only other thing I will mention is that -- well, let me just go ahead and introduce, is the best thing to do, so we can move on to the topics.

In addition to myself today doing the presentations, we are going to have Andrea Sterdis up at the front desk. That is the Licensing Manager for TVA. We will have Tom Spink, also Licensing Project Manager for TVA, and the one that is the day-to-day point of contact. We will have Eddie Grant, and he will introduce himself in more detail later, with NuStart.

Amy Aughtman, with Southern Nuclear Company, is back to my right, will also be listed, and Peter Hastings, who has done the yeoman's work on coordinating the CDWG efforts for the five years that have been working together to try to make sure this content has been standardized, will also be a speaker. I'm sure he will go into more detail on some of the items I have mentioned.

Finally, TVA is the license applicant, despite the fact we have NuStart and we have utilities. So, clearly, I'm here today to represent the management of TVA to ensure that you recognize that we see this as a serious application for us, and not just an effort to standardize an application for the industry.

Thank you.

MR. CUMMINS: My name is Ed Cummins, and I'm Vice President of Regulatory Affairs and Standardization for Westinghouse.

I will also be brief. I think maybe it is useful to set an economic background of what is going on with AP1000.

We have sold in China, after the certification at the end of 2005 for AP1000 reactors,

two at the Sanmen site and two at the Haiying site. The Sanmen site had initial first safety-related concrete in March of this year, and now you can see that they have some of the large structural modules set in place. So things are proceeding quite well at Sanmen.

And at Haiying, the first nuclear structural concrete is scheduled for August, so next month. So things are moving along in China.

In the United States, there have been seven site applications for COL, each for two AP1000s, siting AP1000 as the technology, from six customers. So Progress has two sites. So there is a significant interest in the U.S. in proceeding with AP1000.

And there are three customers who have signed contracts with Westinghouse and Shaw to build AP1000s. Then two of those sites, construction and site preparation work has actually started. That is the Vogtle site and the Virgil Summer site. The third contract is Progress/Levy Florida.

I would also like to introduce our key staff. Rob Sisk is at the front table. He is responsible for the NRC interface and licensing in

the United States. I'm sure he will do a great job here.

That concludes my remarks.

MS. McKENNA: Okay, thank you. I'll pick up now.

I'm Eileen McKenna. I'm a Branch Chief in the NRC's Office of New Reactors, responsible for AP1000 projects. In particular, I'm focusing on the review of the Design Certification Amendment.

I just have some brief overview remarks. You will recall that we had a more detailed discussion with the full Committee in May on this overall project and how we are fitting the Design Certification and the COL reviews together. So I just pulled a few slides from that earlier presentation to kind of set the stage for this morning's discussion.

The first slide is really just a little history of the certification as originally put forth, referred to as Rev 15, which is the version that was actually certified by Appendix D to Part 52. As was mentioned, it was issued late in 2005, and the staff Safety Evaluation was NUREG-1793 that documented the review of that application.

We are now reviewing the Design Certification Amendment application. We actually received Revision 16 in May 2007, and it was premised on the provisions in 10 CFR 52.63, finality of Design Certifications that provides the means by which a party may seek to amend a Design Certification.

Subsequently, we received Revision 17 of the Design Certification Amendment application that updated the application to reflect changes and results of interactions with the staff that have occurred in that intervening time.

Next slide, please.

The staff's review of the Design Certification Amendment is following the typical six-phase review schedule that you have probably heard of for other applications, where Phase 2 is the issuance of the SER with open items. Phase 3 is what we're in right now, which is the meeting with the Committee on the SER with open items, and then Phase 4, 5, and 6 is an Advanced Final SER, the additional interaction with the Committee on that product, and then issuance of the final.

Since this is an amendment, the staff is focusing its review on the changes that are set

forth. It is not a complete Design Certification review de novo. So we are focusing on the changes, and we are using our Standard Review Plan to guide the staff's review in terms of the areas to be looked at and the acceptance criteria that would apply.

As was I think mentioned earlier, one of the things we are doing is issuing, as we saw, we issued individual chapters rather than an entire SER with open items. This was to facilitate the structuring of some of these interactions with the Committee and not have 19 chapters for both a Design Cert and a R-COL, trying to be reviewed all at the same time. So we did issue them as individual chapters, but by the time of the Advanced SER, they will all come back together and be one SER to move forward as a final.

Unless there's questions, that is all I had to say on this. We will, of course, introduce the staff members when we come up for individual chapter presentations because we have quite a number who will be presenting.

CHAIR RAY: Eileen, would you speak to the chapters -- the heading up here refers both to the DCD and to Bellefonte. Could you talk about

these individual chapters that have been broken out from the SER in terms of a chapter related to Bellefonte and a chapter related to the DCD?

MS. McKENNA: Okay. What we did was we worked very closely together to time our issuance and stage of readiness of these chapters to bring forward to the Committee chapters where we have an SER with open items for both the Design Cert and the COL. If you notice closely on the timing, we would issue the COL chapter after we had reached a conclusion on the Design Cert chapters. We made sure that they fit together; where there was information that was being relied upon in the Design Cert, that the COL then would match up with that. So the selection of the chapters is really based on those that were at the state of readiness to bring forward to the Committee, but the important point is that we have the same chapters proposed.

I'm not sure if that totally answered your question, but if not, let me try again.

MS. COFFIN: Our goal was to provide you with an integrated picture of how the licensing of an applicant, the big picture, the DCD and the information from the SER and the individual COL, how

they come together to form a complete picture of meeting our regulations in all aspects.

My name is Stephanie Coffin and I'm on her team. My focus, though, our Branch focus is on the COL reviews.

Similar to Westinghouse, with Bellefonte, we're doing a six-phase review schedule, and we are in Phase 3 right now. I'm meeting with the ACRS.

This review and the SERs that you have in front of you are based on Revision 1 of their FSAR, which, in turn, incorporates by reference DCD Rev 17. I use the term in general because you will see occasionally in the Safety Evaluation Reports we actually reviewed material that was submitted beyond Revision 1, and when we did so, we noted it in the SER.

So the structure of the SER is with open items there are sort of three major characteristics that you will see in each chapter. There are sections that incorporate by reference the Design Control Document. The staff finding that we make in the SER for the COLs is that that incorporate by reference is appropriate and applicable to that applicant.

We don't repeat the matters in the DCD in the SER for the COL. We point, instead, to the NUREG that documents the regulatory basis and the technical evaluation for the DCD findings.

The second major characteristic that you will see in the SER is description of standard COL content. Those evaluations will be applicable to all the COL application as appropriate.

Then there will be a third part of each SER, whether a site-specific that is applicable only to TVA and Bellefonte. In the SERs, we tried to be very clear with the annotations about which is what part.

CHAIR RAY: And it is the last point, of course, which is of greatest interest to us in terms of the discussion we will be having in these meetings.

MS. COFFIN: That is certainly important. Also, the standard COL content, which is an important amount of information, this is your major opportunity to provide us feedback on that content. Because when we come back to you on subsequent COLs, we are not going to repeat that information to the ACRS. So this is your opportunity to give us

feedback on standard content.

CHAIR RAY: Okay.

CONSULTANT KRESS: Will this standard COL show up as a NUREG document or will it be a --

MS. COFFIN: Eventually, it will be a NUREG document. Right now, it is simply an ADAMS Safety Evaluation Report. But the goal would be eventually to turn it into a NUREG.

You asked a question about the R-COL applicant transition. The entire SER with open items is going to be continued to be issued based on the TVA/Bellefonte application. The plan is that Southern/Vogtle is going to respond to all open items that are related to standard content. Then Southern/Vogtle also has to respond to any site-specific issues that remain on their review. We will be evaluating those responses and will be developing the Advanced Final SER with no open items, which is the document that we will come to you with, based on the Southern Nuclear Application. So that will be the first AP1000 COL application to come to the ACRS for final determination.

CHAIR RAY: So we will see it in that form first?

MS. COFFIN: Correct.

MEMBER BANERJEE: Stephanie, can you give us an idea of schedule or is that coming up?

MS. COFFIN: Is Ravi here? April 2010?

MR. JOSHI: This is Ravi Joshi, lead PM for the Vogtle COLA.

Right now, the schedule for completion of that one FSAR is December of 2010, and then coming to the Committee on February of 2011.

MEMBER BROWN: Excuse me. Which SERs are you addressing today? I noticed there were two sets. There is an SER against the DCD, Rev 17. There's an SER against the Bellefonte COL. I still don't understand which one you are going to be talking about today.

MS. COFFIN: Both.

MEMBER BROWN: Oh, both? Okay. All right.

MS. McKENNA: I think when we get into the presentations, it will become more clear. But, if not, please ask again.

MEMBER BANERJEE: You are looking for an interim letter from us or is that not correct?

MS. COFFIN: We would like an interim

letter.

MEMBER BANERJEE: In our September meeting or full Committee?

MS. COFFIN: We would like one as soon as you can get us one. I mean we benefit from this interaction, and getting your written comments only helps us make sure we address any comments you have when we come back to you with the Advanced Final SER. So we are hopeful that you can provide us such a letter.

CHAIR RAY: Excuse me. The issue with the letter that comes to my mind is one of completeness. In other words, are we to the point where we are prepared to issue a letter as if that is the last we are going to say on this subject?

I guess what I had said to Sanjoy a bit ago is we need to discuss whether or not we are clear that any letter is strictly limited to what comments the Committee has at the time, but does not represent finality from our standpoint.

MS. COFFIN: We understand that. This is a subset of information that you are receiving today. It is 10 chapters. It is not the whole review.

I would just reiterate it is helpful for

us to have written comments, with the goal being that we address any concerns that you have before we come back. Having it written helps us.

CHAIR RAY: Sure.

Tom?

CONSULTANT KRESS: When you have an IBR in a COLA, is it referring to the Revised DCD or the older DCD?

MS. COFFIN: It is referring to Revision 17, which is under review.

CONSULTANT KRESS: So you may have to look at those and the DCD at the same time to see if they are appropriate?

MS. COFFIN: Correct.

MEMBER BROWN: You said IBR?

CONSULTANT KRESS: Yes.

MEMBER BROWN: Okay, thank you.

CONSULTANT KRESS: Yes, it will refer back to the DCD.

MEMBER BROWN: Yes, yes, yes, I've got it now. I just forgot that.

MEMBER ABDEL-KHALIK: If I go back to the previous slide, the implication of this structure is that any matter that is presented within the standard

COL of content or the site-specific COL content does not have much of an impact on any material that had been already incorporated by reference from the CDs. How do you assure that that is the case?

MS. COFFIN: I'm not sure I understand the question.

MEMBER ABDEL-KHALIK: Okay. If you divide this into three categories, material that is incorporated by reference, material that is standard COL content, and material that is site-specific, and if I were to look at this, the implication is that what you do in reviewing the material that is incorporated by reference is you sort of confirm that it is appropriate to incorporate that material by reference. But how do you assure that the choice of material that is incorporated in the standard COL content or the site-specific, the specific COL content, does not impact the applicability of the material that had been incorporated by reference?

MS. McKENNA: I think that we always come at it from the other side, that there's kind of a complete set of information that needs to be covered by a COL in a particular chapter, and there is a set of that information that was reviewed and evaluated

as part of the Design Certification as being design information, which would include primarily things like selection of materials we would expect would be part of the design.

Then, incorporated by reference, the COL is essentially committing that that is the material that they are going to use in their particular plant. The standard and the site-specific tends to be information that supplements that design information. It may have a more operational focus. It is things that may not be specific to the actual design. So we kind of build the pieces together.

There is whatever is the design information that is in the Design Certification that is incorporated by reference and becomes then part of the COL application. There is the standard content, but it is that other set of information that, because of its nature, all the applicants --

MEMBER ABDEL-KHALIK: I understand this, but is there a formal process by which you see where any material that is within these two categories touches any material that is incorporated by reference and confirm that it doesn't have any impact on the applicability of that material that is

incorporated by reference?

MS. COFFIN: But there is some formal process in terms of it is the applicant's responsibility, but, of course, we review this as well. If they find some things in conflict with the DCD, they are required to request a departure or an exemption from that DCD. So there is --

MEMBER ABDEL-KHALIK: But within the staff's review, that process of checking any interaction between the material that is in the standard COL content or the site-specific interacts or impacts the applicability of the material that is incorporated by reference, that is not part of your formal review process?

MS. COFFIN: Well, I guess I would like to think that it is.

(Laughter.)

I mean there are multiple checks. This doesn't happen all the time, but --

MEMBER ABDEL-KHALIK: My question is really very specific and process-oriented. Is there a structured process by which you determine that that is, indeed, the case?

MS. McKENNA: I guess, to me, I think to

a certain degree, using the Standard Review Plan would lead the staff through that. Either the information that they are seeking to find in a particular chapter is within the Design Certification and they can conclude that that information is complete and, as Stephanie said, it is applicable to the particular COL, or there is information that was not included in the Design Certification that is necessary to complete the review in that particular topic area. Then they would look to the COL concept to provide that additional information, whether it be standard or site-specific.

MEMBER ABDEL-KHALIK: Well, perhaps it would be helpful if somewhere along the line, if you can find a specific example where your review guided by that process has led you to identify an item that had previously been incorporated by reference that, in your judgment, based on the choice of the standard COL content or the site-specific COL content, that item is no longer appropriate to be incorporated by reference.

MS. McKENNA: Yes. As we said, we can take that and see, as we go through the chapters, if we touch on one of these. If not, we may have to

seek something out more specifically.

MEMBER ABDEL-KHALIK: Good. Thank you.

CONSULTANT KRESS: The standard COL won't have places in it where this will be incorporated by reference?

MS. McKENNA: Oh, it does.

CONSULTANT KRESS: You will have those in the standards?

MS. McKENNA: Uh-hum.

CONSULTANT KRESS: I thought that would be a site plant-specific guide, the COLA itself, and where they would make that decision.

MS. McKENNA: Every COL application has to stand completely on its own merits. The point of making a distinction between standard and site-specific content is the staff is not going to re-review the same thing seven times. We only want to do it once. Although with the subsequents, we want to make sure that standard is appropriate to be applied to that plant. So there is kind of a review that needs to be done to make sure it is appropriate that that standard across the fleet of AP1000 --

MEMBER BANERJEE: I guess interfacing to the grid would be a site-specific --

MS. COFFIN: Right.

We talked about the transition.

The presentation sequence, Westinghouse will present on a chapter-by-chapter basis, Westinghouse will present the Design Certification content. A representative from TVA or NuStart will represent the FSAR content. That is the scalable content. So we have the DCD and have started to distinguish between Westinghouse and TVA applications.

Then, following the applicant's presentations, the staff will present their findings on the Westinghouse Design Certification review and the Bellefonte COL Safety Evaluation Review.

We do have two Subcommittees in the future, October and November, for additional chapters, with the possibility of an additional meeting in early 2010.

Okay?

MEMBER BROWN: Is that the discussion on the transition from Bellefonte to Vogtle that you talked about earlier?

MS. COFFIN: This slide six.

MEMBER BROWN: Okay, that was it.

MS. COFFIN: That is it. I would be happy to --

CHAIR RAY: Well, I have been pondering the point that Charlie is raising here, when trying to listen and digest this at the same time. Could you just go through it one more time?

(Laughter.)

MS. COFFIN: I have a big smile on my face because --

CHAIR RAY: I see the words up there. I mean I understood what you said, but I am not sure I know the implications of it.

MS. COFFIN: And this isn't the simplest thing to do. We support NuStart's decision to make this transition. We think it is in the best interest of this Design Center.

So the Safety Evaluation Reports with open items that you are receiving are going to be providing our findings on the appropriateness of IBR references. It is going to be -- this is the vehicle for conveying our position on standard content material, and then there is going to be information that is specific only to TVA.

Those Safety Evaluation Reports were

issued to both TVA and to Southern Nuclear. They are both going to respond to those open items, all of them. Well, TVA is going to respond to all of those open items. Southern Nuclear is responsible for responding to all of the open items that are related to standard content.

So the staff, as we are developing our first Advanced Final SER for this Design Center, is going to do Vogtle first. They have an early site permit. So much of the site-specific issues have been already resolved and presented to this Committee. So the great focus will be on resolving standard content, and Vogtle would be the vehicle for doing so.

CHAIR RAY: Well, in that case, for example, my recollection is the ACRS letter on Vogtle ESP observed that what was being presented with regard to the early site permit was not consistent with the then-existing standard design for the Vogtle 3 and 4, and that that was noted as an outstanding issue, and just for the record, so to speak, everybody understood that that had to be resolved.

How does that get resolved?

MS. COFFIN: That will be one of the key

items we will be presenting to you when we come back on the Vogtle Advanced Final SER.

CHAIR RAY: But we don't think about that now because we are thinking about Bellefonte. Well, we should move on, but I am just trying to work through all of the steps of that process because, on the one hand, we are required to think about this as the Bellefonte COL, and we will. But in the back of our mind, we are told that the DCD associated with this review will do something called a transition to Vogtle. At that point, what we will see is not the work product that we are looking at today on Bellefonte, but something that represents a final SER for Vogtle.

So I am just wondering how -- it is sort of the question Said asked, I guess. It is an environmental issue, or Sanjoy commented about the grid impacts that would affect the DCD or the incorporate by reference, I mean, material.

So I say all of that, but I don't expect an answer, unless you want to give one. I am just telling you it seems like a very complex process that we have to get our mind around.

MS. COFFIN: Yes, and I will be glad to

work with you to maybe give you a more specific example of how this might work. But I guess I'm trying to -- I'm not doing a very good job making you feel comfortable with this process, but the standard content that you are going to see today is applicable to every single applicant.

I don't believe any of this information has a nexus to some of the site-specific issues that Vogtle needs to respond to.

CHAIR RAY: That is interesting.

MEMBER BROWN: You've got --

MS. COFFIN: Or else it is not standard. That is the whole concept.

MEMBER BROWN: But, I mean, you've got all these listing of chapters, I mean if I can interrupt for a second. They are all Bellefonte COL SERs and then there's a DCD SER relative to the standard design. So I guess in my ignorance my presumption was that there were some -- this standard design has the standard design, but there's something you have to look at relative to the Bellefonte application, and some will all be the same, and maybe a little bit will be different. So we are looking at it for Bellefonte, but, yet, Vogtle is going to use

it.

MS. COFFIN: You are looking at it for Bellefonte and beyond, all the standard content, and this is the Design Center review approach that we have briefed you on.

MEMBER BROWN: But there's no site-specific, zero site-specific --

MS. COFFIN: There is site-specific on TVA.

MEMBER BROWN: No, for these particular reviews today.

MS. COFFIN: There is TVA-specific small amounts, and we will be presenting that to you today.

CHAIR RAY: The question really, Charlie, is whether the DCD is implicated at all in the expectation that it will apply to Vogtle later, and does that affect any of the material that we are looking at here for Bellefonte, recognizing that they will come forward with a COL in a final form for Vogtle?

I think probably we just need to think about this some more, and we have done enough exploration right now; we should move ahead on it.

MS. McKENNA: Okay. Then we will do a

little switch with the -- oh, sorry, it's Andrea that is up next. I'm sorry, I didn't mean to skip you.

MS. STERDIS: Yes. I need to get to the COL slide folder, please.

My name is Andrea Sterdis. As Jack Bailey said, I am from TVA, and I'm the Manager of Licensing for Nuclear Generation Development and Construction.

I am not going to reiterate the dates that Mr. Ray and Stephanie both emphasized, but I do want to point out that, since the January 2008 timeframe, going up through current time, we have been actively working as a Design Center Working Group to address a multitude of RAIs that we have received from the staff.

Consistent with what Stephanie and Eileen have presented, those RAIs fall into two boats. One is a standard content RAI, where everyone works together to establish what the response is, and it applies to all of the AP1000 COL applications, as well as site-specific RAIs, which apply only to Bellefonte.

If you go to the next slide, this provides the outline of the COL application, the

different parts of our application that are there to address all of the requirements of the regulation.

MEMBER BANERJEE: I guess I am coming back to what I thought Said's question was, which is, how do you decide what is site-specific and what is standard? Is there a formal process in place to do that?

MS. STERDIS: We actually do have a formal process.

Eddie, would you like to talk a little bit about our process in detail?

MR. GRANT: I would love to.

My name is Eddie Grant. I'm a Lead Licensing Engineer with NuStart, helping TVA with the coordination of the COL application for Bellefonte.

When we get an RAI letter or a question from the staff, we take a look at it. We do, first of all, a quick review of the COL to see what piece of the COL the question is related to. And if you had a chance to look at our application in any detail, particularly the final Safety Analysis Report, you will see that we have left-margin annotations where we have identified portions of the document as either standard or Bellefonte-specific,

with a BLN lettering or STD lettering in the left margin for various paragraphs, subdivided by divider lines.

I did not bring an example to put up on the screen, but if you take a look, you can see those.

So the first thing we do is look to see which piece of the application does the question relate to. If it is clearly a standard piece or clearly a Bellefonte piece, that helps us decide how the response is going to go.

We develop that response then based on that understanding, and we pass that through a review process that goes to all of the DCWG members. So, if we get what we consider to be a standard RAI or an RAI on standard content, which we then develop a response for, and run that through our review process, such that we get back comments from over half that indicate, no, we won't be able to adopt this as a standard response, then we change modes and we turn it into a Bellefonte-specific response, with the understanding that each of the other COLs, the S-COLAs, the subsequent COLAs, will probably likely get that same RAI from their various project managers

within the NRC and be asked to provide a similar, but slightly different, since they couldn't adopt the standard, response on that. So they would then get that question on each of their dockets.

If we can, if everybody does agree, or even if it is most, we don't necessarily demand that everybody is going to have the same standard response. But if we've got a vast majority that says, yes, we can all adopt that, then we will label it as standard.

There is the possibility that one of the applicants might later on, or even at that time, say, no, I can't; I'm the one guy that is a little different, and for this reason, I can't adopt that. Then they are prompted to send a letter promptly to the project manager to indicate that they will not be able to adopt that standard response, so that that project manager within the NRC can then pursue that on a plant-specific basis.

So we work very closely to make sure that we are able to identify items as standard or, where we cannot be standard for either one or two of the plants, or for the vast majority, to identify that back to the staff. Again, if it is the vast majority

cannot be standard, then we will identify the response as plant-specific. If the majority can be standard, we will identify it as standard. But if there are any individual plants that cannot adopt it, then they will notify the staff that they cannot, and they will do that promptly.

CHAIR RAY: I think that's all right. Okay, the thing I would like to do, in my own mind, and I won't ask you to do it, either, because maybe it is just something I need to do, is to go through that same recitation that you just gave, but imagine that I'm looking at Bellefonte and expecting somehow to be transitioning to Vogtle. That is the thing that is maybe -- if we could just say this is going to be Bellefonte; we're not going to talk about Vogtle or think about Vogtle, then that is the end of it. But this idea that somehow Vogtle is in the room, but not in the room, is confusing to me right now.

MR. GRANT: Can I take a 30-second shot at that?

CHAIR RAY: Sure.

MR. GRANT: Today is primarily Bellefonte. It is a Bellefonte review that has been

conducted on the Bellefonte application, and the information is directly applicable to Bellefonte. It will cover both standard content and site-specific content.

CHAIR RAY: We understand.

MR. GRANT: At some time in the future, Vogtle will also come back to you for an SER review similar to this, except it will be for their final SER.

CHAIR RAY: And that is the difference --

MR. GRANT: That is the difference. So we will have no open items in it. Everything will have been resolved at that point.

They will indicate where they have adopted the standard material that you will have already looked at in the next couple of days and in the subsequent meetings for Bellefonte.

They will also identify where they did not adopt the standard material, where they were different, and they will indicate we have some site-specific information here.

When we get to Chapter 1, I will indicate to you that one of the places where they vary from some of the standard is in Regulatory Guide

conformance. Part of the big reason for that, you mentioned the ESP. They looked at the Regulatory Guides at sometime in the past with a different focus. So they have Regulatory Guide Position Statements all ready and in conformance for those positions in their early site permit, which they intend to maintain for the most part.

So there will be some differences in that area of the FSAR, where they will indicate they have site-specific material. Because it is site-specific, it will come back to you as site-specific material for the review during that final SER review.

CHAIR RAY: But it will be at the final SER review, and that is a difference, but we shouldn't dwell on it any further here.

MS. STERDIS: I will let the staff address the difference between a six-phase review and a four-phase review, which I believe all the S-COLAs are using.

The Bellefonte R-COLA is the only one, I understand, within the AP1000s that is using the six-phase review. So this will be the only time we will discuss the open items that aren't closed.

CHAIR RAY: Well, that is helpful, Eddie,

and it does go to the issue that at least I was struggling with, because the difference between, as you style it, the Vogtle four-phase review and the Bellefonte six-phase review, I am trying to process, well, what are the implications of that for us?

Okay, thank you.

Eileen? Or Andrea? I'm sorry.

MS. STERDIS: That's okay.

On this slide, you can see that Part 2 is highlighted in red, and that is our final Safety Analysis Report. That report has 19 chapters, per the SRP. As you will see today, we are covering nine of those chapters today, and the rest of the chapters will be covered as the SER with open items are issued later in this year, in October/November, and possibly into early 2010.

Next slide, please.

I just want to give you a little overview of our site.

MEMBER BROWN: Can I go back for just a second? On the four-phase for the S-COLAs, I understand the SER will be issued and will be discussed with no open items. But I presume, for significant differences, site-specific differences,

they will at least be addressed?

MS. COFFIN: Absolutely. They are required to be.

MEMBER BROWN: Okay. And say they will be resolved in the following manner, so that they are not open. So that will still be covered in terms of the information for the --

MS. COFFIN: When you get the Vogtle Advanced Final -- it's an Advanced Final SER. It's not a Final SER because it has not been to you.

MEMBER BROWN: Okay. All right. No, I just --

MS. COFFIN: We will reiterate, if IBR is still appropriate, we will reiterate standard content. We will flag anything, any departures from standard content, any departures and exemptions from the DCD, resolution of site-specific material. All that will be in that Vogtle --

MEMBER BROWN: And how they were resolved before they got to a Committee review?

MS. COFFIN: Yes.

MEMBER BANERJEE: I am sort of curious as to why anybody would -- maybe TVA should tell us -- elect a six-phase review rather than a four-phase

review.

(Laughter.)

MS. COFFIN: Don't ask.

(Laughter.)

There are a number of reasons, but the most important is we want your feedback early in the process, so that if some important technical issues arise based on your review, we want the time to resolve them, or the risk.

MEMBER BANERJEE: It seems that they have taken all these other guys' four-phase reviews then, right?

MR. GRANT: Absolutely.

MS. COFFIN: Absolutely.

MR. GRANT: That is our purpose. We work as a group, and we have picked one lead to go forward first.

MEMBER BANERJEE: I get the picture. Okay, thanks.

MS. STERDIS: Okay. I want to give you a little overview of our site. Our site is located in northern Alabama on the Gunnersville Reservoir of the Tennessee River. As you can see here, I have given you a couple of views that show our emergency

planning zones. This zone shows you the 50-mile radius, which does cover not only Alabama, but also parts of northern Georgia and southern Tennessee.

If you go to the next slide, it shows a little more detail about the Bellefonte site 10-mile radius. I do want to point out that the Bellefonte site does have partially-completed B&W units, and parts of those structures that exist on the site are being utilized in the COL application for the AP1000 units, specifically the intake structure and the cooling towers that exist on that site.

If you go to the next slide, this actually shows the LOCA --

MEMBER BROWN: Hold on. Okay, you have to calibrate me here. Those are left over from plants that were never finished 20 years ago?

MS. STERDIS: They were not finished.

MEMBER BROWN: That's the point? So that that part of the facility was already put together? You are just going to utilize those?

MS. STERDIS: That's right.

This picture shows another level of detail. It is a 1600-acre site, and it shows the water that is on both sides. The Gunnersville

Reservoir is on the right side of this picture, and Town Creek, which is a little tributary off to the side, is on the upper side.

This does show you the existing structures that we will be using as well as the location of the Unit 3 and Unit 4, the two AP1000 units that will be sited at this location.

With that, I am going to turn it over to Rob.

MR. SISK: Thank you, Andrea.

Good morning. I'm Rob Sisk. I'm the AP1000 Licensing Manager. It is my privilege to lead off the presentations for the amendment to the AP1000 Certified Design.

As we just started, I would like to note that the amendment represents the work of a lot of people from a lot of different disciplines. I think, as mentioned earlier, we have a small group of folks here today and on the phone to augment the presentation and answer the questions you may have. But, for brevity's sake, I am not going to introduce them all here. We will be calling them up over the next day or two here, as we proceed through the sessions. I would like to take, though, just a

minute to acknowledge who they are, and appreciate their support as we go through this session.

Just to kind of recap where we were, I guess it was a month and a half ago when we were before the body, the amendment does build on the Certified Design, Certified Rev 15, and we are looking at the changes since Rev 15.

Changes were made consistent with the regulatory requirements and were made primarily to address CR information items, address DAC, obviously address NRC requirements and needs, enhance the standardization. I have design maturity in here, but that really falls into the enhanced standardization. As we evolve the design, we continue to look at one standard plant. And of course, to address editorial changes or changes that were needed for consistency throughout the DCD.

CHAIR RAY: I guess you mean design maturity to apply here, but at least the material I read indicated from time to time that changes were made to increase the flexibility in procurement, for example.

MR. SISK: Exactly.

CHAIR RAY: Okay.

MR. SISK: And within the context of standardization.

CHAIR RAY: Well, yes.

MR. SISK: Yes, okay.

As we proceed through the revision, the future changes would be addressed in accordance with the Interim Staff Guidance 11, recently published.

Today, Westinghouse has received 13 SERs on the amended design with open items. We will be discussing 10 of the SERs over the next couple of days, and I have listed them here briefly. We will be discussing the rest of the SERs in future meetings.

At this point in time, we have introduced no new exemptions, no new DAC, and we are in the process of resolving open items as they have been identified in the SER. Currently, there is about 38 open items and 31 confirmatory items.

We are not planning to talk about the confirmatory items today in that confirmatory items are typically characterized as those that I think the staff and Westinghouse have had some agreement to, and it is simply a matter that ultimately we've got to build these into the final DCD document.

CHAIR RAY: Okay. Could you comment on the point that was made about the plants in China that are under construction? Has there been any lessons learned or input from there? They are styled as AP1000, but, obviously, their design is going to deviate some from whatever emerges here, just as a matter of timing.

MR. SISK: There are minor deviations, but Westinghouse does follow the plant standardization across our designs everywhere. We are monitoring closely the China construction projects and support, and continue watching and pulling lessons learned as they move on.

As Ed had mentioned earlier, we are moving forward in the construction base net being laid down, and we are continually having people onsite on the ground there learning and watching and seeing what things can be brought back to the designs or be brought back not just to the designs, but to the construction and the quality programs that go into it.

CHAIR RAY: But it is an opportunity, not a constraint, I take it?

MR. SISK: That is correct.

CHAIR RAY: Eileen, did you want to comment?

MS. McKENNA: No, that's fine.

MR. CUMMINS: This is Ed Cummins. I would like to make just a little comment there.

First, the scope of our supply in China does not include the turbine island. So it turns out that each of the sites in China has a different turbine island design, and it is not equal to the AP1000 turbine island design.

If you look at licensing, they have a kind of two-step PSAR or FSAR construction permit, operating permit, licensing regime. Westinghouse provided input for the license as Rev 16 of the DCD. We had every intention at the FSAR stage of updating that to Rev 17, including whatever agreed-upon changes we have with the staff post-Rev 17 into the China licensing environment.

So we are trying to keep standardization, I'll say, of the nuclear island because we really don't have any control over the turbine.

CHAIR RAY: Thank you.

MEMBER BROWN: So, when the steam leaves the pipes, you don't have it anymore? And when the

water comes back in, that's when you gain control of it again?

MR. CUMMINS: Well, there is really at a building we have the main steam isolation valves. So we take it to the end of the nuclear island. Then they take the steam pipe and the feed pipe there.

MEMBER BROWN: Yes, that is what I was trying to get to. I just wanted to understand. Stop valves out or whatever the demarcation is and feed reg isolation, whatever that is.

MR. CUMMINS: Right.

MEMBER BROWN: And feed water, that is where there is demarcation also.

MR. CUMMINS: Exactly.

MEMBER BROWN: Downstream of that, it doesn't necessarily reflect what is in your DCD relative to the U.S. plants.

MR. CUMMINS: It does not.

MEMBER BROWN: Okay.

MR. SISK: And that is for China.

MEMBER BROWN: That's fine. No, I was just trying to make sure I understood the total context of the question.

CONSULTANT KRESS: Does the China FSAR

follow the same format, the content, that the U.S. FSARs have?

MR. CUMMINS: It is very close to that, yes. We use the same basic Reg Guide 178, yes.

CONSULTANT KRESS: And it has the same design basis accidents?

MR. CUMMINS: Yes.

CHAIR RAY: Rob?

MR. SISK: Yes, I would like to just make one other note before we go into Chapter 1. This being an open session, and we do have our technical folks coming in, we would look to have the discussions at the non-proprietary level, obviously. If we need to go into a proprietary discussion, we would want to identify that. We can carry that on at a different or a later time.

CHAIR RAY: That's fine. You should speak up anytime that that is an issue.

MEMBER BROWN: One other question. I guess I didn't understand. This says there's some partial Rev 17. What does that mean?

MS. McKENNA: Well, let me speak to that. As I indicated in the slide, they had submitted 16, and then last fall they submitted 17. In some cases,

the staff had already completed their review of particular sections on Rev 16, and based on availability of staff and other reviews, they may not have been able to immediately start the review of Rev 17 at that time.

We have been working with the staff since then to go back and look at 17 to make sure there is nothing in there that is of concern. In fact, you will hear on a couple of chapter presentations where there is some new information in Rev 17 that the staff is evaluating. It is the intention, obviously, that all the chapters will catch up and include 17 and whatever information even beyond 17 that has transpired when we come with the final SER.

MEMBER BROWN: Okay. It just wasn't obvious.

MS. McKENNA: Yes.

MEMBER BROWN: The SER for a couple of the chapters that I looked at, I had no clue that this was --

MS. McKENNA: Yes, within the details, SERs, you will see on kind of a section-by-section basis they specifically identify what scope of information the staff did review, and where an SER

doesn't cover 17, we will have to catch that up later.

MEMBER ABDEL-KHALIK: You indicated that there are 31 confirmatory items you will not discuss.

MR. SISK: Yes, sir.

MEMBER ABDEL-KHALIK: These are items that you and the staff had agreed to, but do they involve any technical modifications from the original DCD?

MR. SISK: Generally, what they represent are items of clarification or annotation that needed to be added to the DCD to enhance the clarification or to cover an issue that the staff wanted to see physically in the DCD, but not one that we are in any kind of technical dispute on. It is just a matter of catching it.

We are in the process of looking at an amended design, the amended, all through the RAIs and all through the questions and issues that are being explored today, as we come to an agreement.

MEMBER ABDEL-KHALIK: I'm trying to figure out whether these confirmatory items involve revisions that are of a technical nature that the Committee should look at.

MS. McKENNA: Well, I guess the point is that these, they could, but I think the distinction we make between confirmatory and open is that, whatever that technical information was that was being reviewed, there was a presentation in an RAI response, or whatever, that this is the answer to the question, and the staff is satisfied with that answer to the question, but there may be a need for some particular set of information to be carried over into the DCD, whether it is to clarify or to change the wording, or to add some technical detail, whatever that information might be, but that there is nothing that is unresolved between the applicant and the staff.

MEMBER ABDEL-KHALIK: But the point I'm trying to make is that the fact that there is nothing yet to be resolved, or the fact that the staff has accepted the response, does not, if the matter is of a technical nature, does not negate or obviate the need for the Committee to look at it.

MS. McKENNA: And they are all discussed in the Safety Evaluation Report. If you have questions on any particular items, certainly, the staff would be happy to answer those questions. It

was a matter of what we were going to actually present, was really what we were trying to distinguish.

But all the confirmatory items are discussed in the Safety Evaluation Reports. So you have that information available to you.

CONSULTANT KRESS: The DCD was amended because of significant changes, I presume, to the design?

MS. McKENNA: Yes.

CONSULTANT KRESS: I was looking through the material I have, and I haven't looked at all of it yet, but I was looking for just a list of here are the significant changes.

MR. SISK: Chapter 1, we'll review --

CONSULTANT KRESS: That is in Chapter 1?

MR. SISK: We are going to talk about that in just a minute.

CONSULTANT KRESS: Okay.

CHAIR RAY: Well, we are going to talk in more than a minute, maybe two minutes, on Chapter 5. But to just use it as an illustration of Said's question, it says here, for example, as a for instance, "The information above was provided by the

applicant in draft format, but has not yet been formally submitted to the staff. Staff identified this issue as confirmatory item" umpty-ump.

So they have set forth an answer, but they haven't yet incorporated it formally. That gets tagged as a confirmatory item.

MS. McKENNA: Right. Again, this is kind of, as you said, a tag for us to go back and make sure that we get Revision 18, that that information was appropriately placed in the Design Control Document, so the staff can be satisfied that the issue is, indeed, resolved.

CHAIR RAY: Yes, but that doesn't detract from the point that, while it is technical information, and until it is formally included, you don't know for sure.

MS. McKENNA: Right.

CHAIR RAY: In this particular case, for example, there was a comment about the RTD being located at the top of the hot leg, and then later on in the same paragraph in the upper half of the hot leg. Well, is that the top or not? I don't know. But it was just a confirmatory item, and it is not that certain what the end result is going to be.

Yes, Mike?

MR. LEE: Let me just push that thread a little farther. Is there the potential for confirmatory items to become open items?

MS. McKENNA: It is possible. As I said, we mark them. We are expecting a certain set of information to go into -- I didn't say it becomes an open item, but it is possible that, when we see something in Rev 18 that we thought was confirmatory, if it didn't conform what we had stated as this is what's the confirmatory item, then it would be something that would have to be reviewed further, but I wouldn't call that an open item because it would be something we would just have to push forward to resolution to put in the final SER.

MR. LEE: Well, how do you distinguish then -- I guess the question is, what's the distinction or differentiation between a confirmatory item and an open item? Because the open items come to the Committee; confirmatory items clearly aren't going to come to the Committee.

MS. COFFIN: Everything comes to the Committee.

MS. McKENNA: Everything comes. It's all

written and these are presentations.

Again, I think there is a sense of, yes, the open items, there is still something that we have not had a meeting of the minds between the staff and the applicant. There is still information to be developed and reviewed.

Whereas, in the case of confirmatory, if we have one of them right, and maybe we marked one wrong that we said it was confirmatory and we should have labeled it open, but we are tracking all of them.

For a confirmatory item, we think we have reached an agreement as to what is the resolution of that issue, and it is a matter of, did it show up in the document the way we expected? But, obviously, all of this information is within the purview of the Committee. I think our sense was there might be more interest in the open items because there is still something there to be settled.

MR. LEE: Okay. All right.

MS. COFFIN: And they are usually the more complicated --

MS. McKENNA: Right, that's why they are still open.

MS. COFFIN: -- technical issues.

CHAIR RAY: Yes. Well, in this particular case, for example, of the RTD, just to dwell on it as an example is all, the location of the RTD has to do with being able to recognize voiding in the rad cool pipe. So is the upper half okay or do you really want it at the top? Who knows? You guys have got to decide on the staff which is required, but it is said both ways, one by the staff, one by the applicant, and they aren't exactly the same.

It would be nitpicking to say, I think, in my opinion, in a way that that is an open item, but, on the other hand, you may care whether it is in the top or just in the upper half. That makes it a technical issue, like Said was indicating.

Okay, where are we? Chapter 1?

MS. COFFIN: Chapter 1. We are going to switch to Chapter 1. We are going to switch presenters.

MR. SISK: I was going to say Chapter 1 is a nice place to start really because it provides a nice overview of the Certified Design.

Chapter 1 is the introduction and general discussion portion.

CHAIR RAY: Wait one. I got on the wrong pile of paper here somehow. Thank you. Got it. Appreciate it.

MR. SISK: In general, Chapter 1 provides a general overview of the Westinghouse AP1000 Simplified Passive Advanced Lightwater Reactor Plant. It also discusses the objective design criteria for the operating characteristics of the AP1000 plant site interface requirements and references the design documents regulatory basis for the AP1000.

Again, as the Certified Design, what we are really looking at today is focusing on the changes to the Certified Design, and they will be discussed in-depth as we proceed through the various chapters.

We had a question with regard to, what were the typical, the major changes, if you will? What we have done is I have provided just a brief list of what we think these more interesting or significant changes are. We will talk about those a little bit in other chapters because they really do fall into the technical chapter discussions.

But to kind of give a quick overview, the extension of the seismic spectra to various soil

conditions beyond the hard rock, if you will; revision to building for enhanced protection; looking at the security issues; clearly, working with our resolution to resolve DAC where we can with --

CHAIR RAY: Excuse me. You have to be careful about your microphone. It may be somebody on the telephone line. We'll put it on listen-only. If we need somebody as an expert, we will take it off.

Go ahead.

MR. SISK: Okay. We have certainly worked to address the DAC with the protection system instrumentation, changes to the electrical system, and we did make a change to the turbine manufacturer.

Next slide.

CHAIR RAY: Excuse me. Did the change to the turbine manufacturer, based on looking at the rest of the stuff, that impacted the control system as well, which you discussed?

MR. SISK: We will talk about that a little bit.

CHAIR RAY: No, I understand that. I'm just saying, was that the change that impacted that?

MR. SISK: No, sir.

CHAIR RAY: Or was that separate?

MR. SISK: It is separate. We actually changed the turbine manufacturer. As the original Certified Design, we were using an MHI turbine. Through the progression of Westinghouse, we now use a Toshiba turbine, but they basically meet the same requirements.

CHAIR RAY: It's a big change to a single-shaft machine.

MR. SISK: It's a big turbine.

CHAIR RAY: Completely different.

MR. SISK: Yes, sir.

CHAIR RAY: You will talk more than briefly about it, I suppose, when we get to these chapters --

MR. SISK: Yes.

CHAIR RAY: -- but that's the right thing to do.

MR. SISK: Again, continuing down the list a little bit, the sump screen design analysis that really is focusing on addressing the industry issue GSI-191; addressing control room ventilation, both to the control room issues; spent fuel pool capacity; load-handling capability. We have added wastewater monitoring tanks. We will talk about that

in Chapter 11 today, as it turns out.

We made a change to the integrated head -- we changed out the head packet to put in an integrated head package. We revised our LOCA methodology, going to the best estimate ASTRUM. We have made changes with regard to some of the reactor internal changes and pressurizer-shaped changes.

So, again, we will touch on these as we go through some of the chapters and get a better understanding of what those changes might be, what their impacts might be.

Next slide.

MEMBER BANERJEE: Are these changes also going to be incorporated in the Chinese plants, like the pressurizer-shaped changes?

MR. SISK: Yes. With regard to what is within the nuclear island, again, I want to clarify or reiterate what Ed was saying earlier. Within the nuclear island, we have a consistent design. Things like the turbine outside, that doesn't necessarily apply.

MEMBER BANERJEE: Yes, but whatever changes are going through here will be incorporated in the Chinese design as well, right?

MR. SISK: Within the nuclear island.

MEMBER BANERJEE: Yes, within the nuclear island.

MR. SISK: Yes, sir.

MEMBER BANERJEE: Okay. And you're going to talk about all these, each of these items?

MR. SISK: We will touch on them as they impact the chapters. Now we can certainly have the individuals go into specific questions as you have them within the constraints of the time and interest that you have in details. We are going to be talking about the chapter changes and putting them in context to those chapters. Then, as there are other questions that need to come up, I think we should explore them within the technical chapter.

CHAIR RAY: Rob, your answer could be interpreted as more of a commitment than a goal. Did you mean it as a commitment, that the Chinese plant would incorporate all of the --

MR. SISK: It is not a commitment.

CHAIR RAY: Yes.

MR. SISK: It is a goal.

CHAIR RAY: Okay.

CONSULTANT KRESS: Do any of these

changes impact the PRA results?

MR. SISK: All of the changes are evaluated with regard to what their impact would be on PRA. We will talk about Chapter 19 and we can certainly raise that question again, but we do look at these changes for what their impact may be on PRA.

MR. CUMMINS: So maybe I'll comment -- Ed Cummins -- on the Chinese again.

The Chinese and Westinghouse have a contract, and that has a scope of supply. The contract comes somewhere before you have all your changes maybe. The contract was signed that covered all the changes we had at the time that we signed the contract. So all those changes that we knew about at the time of signing of the contract are included.

As you go forward, changes that we might make, there's got to be a commercial and technical discussion with the Chinese regarding whether they are willing to incorporate.

MR. SISK: Yes.

MR. CUMMINS: So, for example, the best example is an airplane crash. We are in an unknown space on what the Chinese are going to do with airplane crash. They haven't decided. We have

decided for the U.S., but they haven't decided. So that is an example of one where we are still talking.

MEMBER BANERJEE: With, for example, GSI-191, I mean the way to deal with it might involve insulation, a buffer, or sump screens. I mean it is a wide-ranging solution to these problems. I mean it is not just a sump screen.

So are you also making any changes to, for example insulation of resources or is it just the sump screen?

MR. SISK: Well, we can talk about that when we get to the details on GSI-191. Generally, we have addressed cleanliness of the containment. We can address insulation. We address sump screen, all of those issues that go into addressing the GSI-191, and we do that for all of our plants.

MEMBER BANERJEE: And the buffer, presumably?

MR. SISK: And the buffer.

MEMBER BANERJEE: If you're happy with your buffer, it's okay.

CHAIR RAY: Okay.

MR. SISK: Okay. With regard to Chapter 1 of the DCD, there were two open items that were

identified that we are working with the staff to resolve. Both of these we really anticipated, recognizing that Chapter 1 tends to be a bit of a catch-all chapter. These are, I think, primarily open to address or capture changes that may come out of the other chapters.

Specifically, NWE2-01, which talks about the list of figures, COLA action items. We have a list, but should that list change as a result of the reviews of the other chapters, that list would have to be updated.

The other open item is a confirmatory again. We have a list, a final Reg Guides list, other information as part of the reconciliation of Chapter 1 with other chapters.

Again, as the other chapters complete their review, if there's an impact to the overall list of regulations, overall list of drawings, figures, COL actions, we would expect that we would have to incorporate that into the final Chapter 1.

CONSULTANT KRESS: You have ho-hum items?

MR. SISK: I would like to say that, but they're never ho-hum.

(Laughter.)

I would agree.

With that, that really covers where we are with Chapter 1 and the DCD.

I will turn it over to Eddie to talk about Chapter 1 and the COLA.

CHAIR RAY: Well, somewhere in here, and I'm not sure where yet, it's not important, I guess, these are described as extensive changes. I think that is an accurate statement, quite a number of substantive changes.

MR. SISK: We agree.

CHAIR RAY: Okay.

MR. GRANT: Thank you very much, Rob. Eddie Grant, again, Lead Licensing Engineer with NuStart. I appreciate the opportunity.

This slide just lists out the sections of Chapter 1. They match with the DCD and Reg Guide 1.206, which is the requirements for the format and content of an FSAR.

Go on to the next one.

We have tried to understand your preferences, where we are going to attempt to discuss and lay out a format here where we would discuss those things that are different from the FSAR.

On the previous slide, you saw that we listed those sections out by two-digit section. With each one of those sections, we incorporated by reference, generally, at the beginning of that two-digit section, the DCD information. Then we provide additional information in a number of ways.

One is the COL items, which we've got here on this slide. These are items left over from the DCD that they did not address, that indicated that an applicant would need to address those items.

We also had supplemental information where we looked at the Reg Guide 1.206 that is, again, the staff's standard content and format guidance on what needs to be in an FSAR. If we saw that there was information that was not provided by either IBR, incorporating by reference the DCD, or by answering the COL items, then we would add that information because we know the staff is expecting to get that. That is addressed with a left-margin annotation of SUP, supplemental information.

The third item that we have, a third item, is where we might need to take a departure from the COL. We would identify those with a left-margin annotation of DEP, departure.

The final item on that that we would generally cover today at least would be the open items, the things where we still have either some disagreement with the staff or disagreement, more likely, at the time that the SER was written. There's been quite a bit of time between then and now, and we, hopefully, have addressed most of those or we are getting close.

So these COL items are some of the listings of the items that are in Chapter 1. Well, actually, it will be all of them between this slide and the next one.

Construction start-up schedule, there was a request. The DCD, of course, cannot address the construction and start-up schedule for each plant. So that is an individual thing.

You will note there that that is identified as BLN 1.1-1. So that a plant-specific item. The schedule information was provided, but it is specific to Bellefonte.

The Regulatory Guide conformance, the DCD addresses a large number of the Reg Guides and portions of many of the remaining Reg Guides, but there are portions of the Reg Guides that are plant-

specific or are applicable to programmatic-type information. Where those exist, there was a COL item that said that we needed to go back as an applicant and address those portions of those Reg Guides. So we have done that.

The vast majority of those we were able to identify as standard information. You will see there that that COL item, again, is listed as STD or Standard 1.9-1.

The same type of information with regard to bulletins and generic letters. The DCD was written up to a certain point in time. Bulletins and generic letters continue to come out. So there are some that are beyond the ones that they have addressed that we needed to address. There are also some of those bulletins and generic letters that address plant-specific, either programmatic information or information related to plant-specific systems.

MEMBER BANERJEE: Can you give us an example from this STD 1.9-2? Can you give us an example of --

MR. GRANT: Bulletins and generic letters?

MEMBER BANERJEE: Yes. Take one, for example. Take one.

MR. GRANT: Well, 05-02 I think was one of the last ones that was issued. I'm sorry, but the content there is not coming to mind. But I know that the DCD had not addressed up through 2005. They were submitted back in approximately in 2003, something along those lines. So they had addressed them up to that point.

We looked at 2005-02, and I believe that was a bulletin.

MEMBER BANERJEE: So 2004-02, for example, with regard to GSI-191 was not addressed then?

MR. GRANT: I would have to go back and check on that. I will be glad to look into that and get back to you with that information.

CHAIR RAY: Perhaps during a break, you can do that.

MR. GRANT: Yes.

MEMBER BANERJEE: You have a list of that somewhere, right? I mean STD 1.9-02 and 1.9-03 are clearly of interest to us.

MR. GRANT: Yes.

MEMBER BANERJEE: We need to know exactly what --

MR. GRANT: Yes, sir. Okay.

When we look at them, I do not see 04-02 listed in our document, but it begins with 05-01 and 05-02. 05-02 was emergency preparedness information, as it turns out here, and we would have addressed that in our emergency plan, in our application, again.

The 04-02, I believe -- and I will have to go back and check -- I believe that was addressed through the DCD, but let us check on that and we will get back with you.

MEMBER BANERJEE: Please, yes.

MR. GRANT: I know they certainly are addressed in GSI-191.

MR. SISK: Yes, GSI-191 was not closed out in the Certified Design, but as an action on that list, it can be closed out.

MEMBER BANERJEE: Okay.

MR. GRANT: Thank you.

There is a bit of information with regard to specifically generic issue 191. That is the Standard 1.9-3, unresolved safety issues and generic

safety issues. Again, the same type of thing, only up to a point; we picked up the ones that are new. We also addressed the ones where they had addressed the design portion, but not the programmatic information. So we looked at the programmatic information and provided our conformance assessment on those.

1.9-1, for instance, has some information with regard to housekeeping and cleanliness, and how we are going to do that. So we provided information in Chapter 6 of our FSAR to address that portion of GSI-191.

The next slide.

This is other information. You see that the second portion of the left-margin annotation there is SUP, S-U-P, for supplemental information. This is particular information that we provided.

In the first case, where we thought it was important, it wasn't necessarily requested by Reg Guide 1.206, but because we were using these left-margin annotations to address the standard information and the plant-specific information, where we have addressed the COL, where we are trying to address a departure, where we are providing

supplemental information, we wanted to get that across, what type of information each one of those is.

So we needed to put something in Chapter 1 to let the staff know, to help them understand what we were doing, and why the information was there, whether it was standard or whether it was plant-specific.

MEMBER BANERJEE: Excuse me.

MR. GRANT: Yes, sir.

MEMBER BANERJEE: I'm sorry to interrupt. If you go back to your previous slide, for example, you mentioned that in the LOCA methodology now you are using ASTRUM for your best estimate on certainty analysis.

MR. SISK: Once it gets approved.

MEMBER BANERJEE: Yes, okay. So, once it is approved, of course, you simply refer to the approval process, but what was the need to change -- was there a need to change the methodology or just to make things orderly, a housekeeping sort of thing?

MR. SISK: Well, it is the preferred methodology for --

MEMBER BANERJEE: Right, but you already

had something accepted, right?

MR. SISK: It's the best estimate methodology that we currently use throughout.

MEMBER BANERJEE: Was there any open item related to that or it was all closed out in the --

MR. SISK: Right.

MEMBER BANERJEE: -- old DCD?

MR. SISK: Correct.

MEMBER BANERJEE: Why did you bring it up then?

MR. SISK: As I recall, there was a 50.46 that had to address, as you do the analysis, the 50-degree temperature difference that ASTRUM addressed.

MEMBER BANERJEE: Come again?

MR. SISK: There is a 10 CFR 50.46 --

MEMBER BANERJEE: Right.

MR. SISK: -- requirement that, when you go beyond 50 degrees PCT, you have to have a plan to recover that, and ASTRUM was the methodology we used to recover that.

MEMBER BANERJEE: Okay. Maybe you can go --

MR. CUMMINS: Maybe I can help here. Ed Cummins again.

Basically, our customers and us both want to margin to our limits, and we have had in the Certified Design very small margins to the peak centerline temperature limit. And you couldn't get, with this different probabilistic treatment of the results, we got -- I don't remember exactly -- 150 degrees instead of 50 degrees. So that is the motive.

MEMBER BANERJEE: Okay. Thank you. That tells me exactly why you did it.

MEMBER ABDEL-KHALIK: With regard to item 1.9-2, bulletins and generic letters, it is understandable, of course, that you address any bulletins and/or generic letters that are on the books when you submit the application. But how does the staff evaluate the applicability of any bulletins and/or generic letters that may be issued between the time the application is submitted and the approval process is completed?

MR. SEBROSKY: My name is Joe Sebrosky. I work for Stephanie Coffin. I'm the Lead Project Manager for the Bellefonte Safety Review, and I will look to Eileen if I say anything incorrect.

It is something that we have had

experience with before. If you go back to the designs that we have certified, the four designs that we have certified, what an applicant is required to do is address the medium- and high-priority USIs and GSIs. Through SECY papers, we also said, as part of the operational experience, we would expect them to address bulletins and generic letters.

Obviously, when you looked at some of those applications that came in, and it took us five, six years to review that, what we did is, as that bulletin or generic letter became known to the staff, we would ask RAIs and ask Westinghouse to disposition those.

So, if you look at the SERs for the designs that were certified, it pretty much tries to update those to the bulletins and generic letters that were in effect at the date that the SER was issued.

It is required that the date that the Design Certification -- and I will look to Jerry Wilson if I say this incorrectly -- the date that we did the certification, they are required to comply with all rules and regulations that are in effect as of that date.

So, if a rule gets promulgated on the day that we intend to do it, the Design Certification, we may have to go back and change our schedule and adjust it, and make sure that the applicant addresses that.

So, to answer your question, there's things that are required by our regulations that have to be up-to-date when we do the certification. For bulletins and generic letters, the process that we worked is to try to make it as current as possible on the date of the activity, either granting the license or granting the certification.

Jerry, Mr. Wilson, who wrote 10 CFR Part 52, just indicated that my answer was somewhat acceptable to him.

(Laughter.)

MEMBER BANERJEE: I am still sort of struggling a little bit with these things like generic safety issues. So, for the existing current plants, there is a process that people go through to close out the conformance or whatever exists, compliance to the requirements.

The staff are handling these on a case-by-case basis. Now are you going through a process

like that for this plant now with, say, GSI-191? There is a clear process which every current plant goes through. Is that the sort of thing you are doing right now?

MR. SISK: We are, if I understand the question correctly, we do monitor the operating experience and history throughout, identifying any kind of safety issue. But let's just focus on GSI-191 --

MEMBER BANERJEE: Yes.

MR. SISK: -- a long-term industry issue that is being resolved.

We are working with the staff, as part of their resolution to the amended design chapters, so that we will come to a satisfactory solution to that issue.

MEMBER BANERJEE: So, for an existing plant, for example, the staff at NRR --

MR. SISK: Right.

MEMBER BANERJEE: -- requires they go through some testing protocols. You know, they have to prove that things work. Eventually, there is a process of review. There is an integrated review process it goes through. Then, eventually, each

plant individually is closed out. It hasn't happened yet, but it is in the process.

MR. SISK: Right.

MEMBER BANERJEE: Maybe, by the end of next year, we hope we will close all of them out, if we can. Okay.

It is a pretty formalized process of testing and all sorts of things that go into this for a plant, water management schemes, and so on.

Because this design now, when it is certified, it is going to be built like this, right?

MR. SISK: Right.

MEMBER BANERJEE: And we have to be sure that you don't have the sump-screen-blockage problem. Are you going through some process like that?

MR. SISK: Yes.

MEMBER BANERJEE: So that came up after, more or less, your original? Now you have re-opened this.

MR. SISK: We do sump screen testing. We are doing a lot of these same tests that the industry is doing, and I think the important point to note about a new plant or AP1000, this issue was there when the plant was being designed.

MEMBER BANERJEE: Sure.

MR. SISK: So, from day one, a consideration of cleanliness and how the plant was put together, this issue --

MEMBER BANERJEE: Yes. Let's say, it would be foolish for a plant today to put any fiber in the insulation. You have no fiber, I take it, right?

MR. SISK: I won't say that, no. But you have to consider GSI-191 and the potential for sump blockage and downstream effects in your design and in the application of where you might -- we put MRI --

MEMBER BANERJEE: You have a golden opportunity to eliminate the problem, right, as much as possible?

MR. SISK: As much as possible, yes, sir.

MEMBER BANERJEE: Yes, as much as possible.

MR. CUMMINS: Maybe I can help here. Ed Cummins again.

I would say that there is a resounding yes to your question. Does yes apply to everything? I don't know. But yes applies to GSI-191. We are doing all the things, at least more than other

things, the operating plants are doing.

MEMBER BANERJEE: You have the sword of Damocles hanging over these plants?

MR. CUMMINS: Right.

MEMBER BANERJEE: Right.

MR. CUMMINS: But just to get a kind of regulatory basis of it, the reason we did no known finality on that topic in the Certified Design because we had an open item regarding sump screens. So, if you had a different issue, for example, where we did have finality, you might have a different answer. But in this case --

MEMBER BANERJEE: Say with non-condensables in the safety injection line.

MR. CUMMINS: Yes, I would say, in that case, we have to ask the staff what their review is, but there we would say that that is part of the Certified Design, I believe.

MEMBER BANERJEE: You've designed as much venting and sloping and all that sort --

MR. CUMMINS: Right, right.

MR. SISK: I do want to add it is part of Certified Design, but we do look at other things. If there are safety issues, we would have to address

them.

One of the mechanisms -- and I can defer to the staff on that -- we are like an operating plant in many respects. So, when an issue comes up, we still have to evaluate it against our plan. If it is not a significant safety issue --

MEMBER BANERJEE: That is a good answer, yes.

MR. SISK: Okay.

MR. GRANT: And I was able to find, Member Banerjee, that we did, indeed, address Generic Letter 04-02 on the potential impact of debris blockage. That is the housekeeping and cleanliness information that I indicated is in Chapter 6. So we will get a chance to look at that when we talk about Chapter 6.

MEMBER BANERJEE: Yes. I would also be interested in knowing -- this non-condensables business is an ongoing issue right now.

MR. GRANT: Okay.

MEMBER BANERJEE: How you are dealing with that?

MR. GRANT: All right. Any other questions on the COL items?

(No response.)

Next slide. Yes, thank you.

Picking up with the second item there, the Bellefonte Supplement 1.4, we are just identifying agents and contractors that are used to build, design, and operate the plant, again, something that the DCD could not do for each individual plant.

We have in Section 1.6 identification of -- you have heard a couple of times "incorporate by reference". This is where we specifically identify those documents that we do incorporate by reference.

The first one is the DCD. That is the major document that we incorporated by reference. This is where we identify the specific revision that is incorporated by reference, and it does currently say Rev 17. When there is a Rev 18, or, God forbid, a later one, then we will adjust our COL to incorporate whatever revision turns out to be the last revision of the Certified Design. We will adjust that here.

So that, wherever you read, we have incorporated by reference the DCD throughout the

document. You come back here to find out what revision that is in Section 1.6.

We have also incorporated four NEI template documents, 06-13, 07-02, 07-03, and 07-08. These address training programs, maintenance rule programs, radiation protection programs, and a program to keep doses as low as reasonably achievable.

We were able, as an industry, to put together a template that says we believe this is an acceptable program; it doesn't matter who you are or where you are, this would be an acceptable program description. We have put those together through NEI as a template and adopted those just as though they were written into the FSAR. That is what incorporate by reference is intended to apply.

Those documents are a portion of our FSAR. Those documents are still under review. When they are approved -- actually, two, three of them have been approved; 06-13 has been approved; 07-02 and 07-03 have been approved. Two of those we have completely incorporated with the latest version that was approved. 07-03 we should get to the staff within the next couple of weeks, the final

incorporation of that.

07-08 we understand is on schedule for an approval approximately the end of August, and it will take us a month or so to do that incorporation. We will do that as that comes around.

So plant-specific systems are identified in 1.7. It's just a list. Those are discussed later in different portions of the document. Some of those systems are circulating water, raw water, service water, and the offsite power system is, as Member Banerjee pointed out earlier. Those will be in Chapter 8, Chapter 9, Chapter 10 and discussed further in those discussions. And those are plant-specific. So you note that it starts with BLN left-margin annotation.

Interfaces COL items and departures, we have identified that as Bellefonte supplemental information. Generally, it is that way. There is some of the information that could have been standard, but we didn't break out individual, tiny pieces to call those standard when it was a large response. So there will be individual items from each of the plants, each of the AP1000 applications, to address those items.

We will talk a little bit about some of the departures later in the day. In fact, I've got a slide coming up very soon to address those.

Section 1.9, we have already talked about through the COL items, some of the regulatory criteria and guidance conformance. In particular there, a large piece of that supplemental information, because much of it was COL items, but one piece that wasn't covered by the COL items is Standard Review Plan conformance.

I would like to point out here that one of the things that we do, as the Design Center Working Group, is take a look at the Standard Review Plan. We use that as guidance as well, along with the Reg Guide 1.206. We look for missing information and what kinds of things the staff is going to be looking for that wasn't identified in either the DCD or through the COL items, and put that together, the information, so that we can say, yes, we have conformed with the Standard Review Plan or, no, we are missing a piece of information and don't want to put that in, and therefore, identify an exception, and of course, then justify that exception if we take one. But all of that, again, is in a table in

Section 1.9, where we address Standard Review Plan conformance.

But we can look there to identify if there is anything missing. We check against the Reg Guide 1.206 to make sure that anything is missing, much the same as the staff does when they get the application in. They use those same documents to make sure everything is there, nothing has been missing.

And we use our subject matter experts to look at the individual items that we are putting in and to check it against the incorporated by reference DCD, to make sure that whatever we are doing does match up (a) with the interfaces, as identified in Section 1.8 there, and that we are not doing something that would cause a problem with any of the Certified Design or the DCD document.

So we do look, just as you indicated, Member Abdel-Khalik. I may have a little trouble with that name, but I will work through it. But we do look for those, and to determine if, indeed, anything that we have provided would cause a conflict with any of the Design Certified information in the DCD.

When we do identify one of those things -- and again, we use our subject matter experts who are very familiar with both sets of documents, and how they need to fit together to identify those, just as the staff does when it comes in. They will use their own subject matter experts during that review to identify those concerns.

We use that, then, to identify if we need to take a departure or do we need to do something else. Perhaps we need to modify the information we're going to provide, so that we don't have to take a departure.

CHAIR RAY: Well, it is good for you to assure us of that. I think our question goes, how do we gain visibility to that process?

MR. GRANT: Yes. Well, that is difficult because it is a very much behind-the-scenes process --

CHAIR RAY: Yes.

MR. GRANT: -- that is conducted, again, mostly by the subject matter experts as they look at the individual pieces of information and do those reviews, both within our organizations and within the staff's, I believe. So making that visible could be

difficult.

CHAIR RAY: Well, that is what we are pondering. Okay.

Ed, before you go to the next page, I wanted to note something to Mike Lee here. Member Dr. Mike Ryan is participating, although he couldn't be here, in this Subcommittee's review of certain sections. I will note that these NEI documents here included ones that are still pending approval that he will want to be aware of. I think it is 07-03 and 07-08.

MR. GRANT: Actually, 07-03 has been approved. We just haven't completed our incorporation of that approved document, but we are very close to that, moving that in.

CHAIR RAY: All right.

MR. GRANT: 07-08 is still under review. It looks like the schedule for that is near the end of August.

CHAIR RAY: But they have to do with areas that he is looking at for us.

Thank you.

MR. GRANT: This slide just addresses a listing of the departures. Again, you will see they

are in various chapters. The technical ones, the bottom four there are all plant-specific, and they will be addressed in Chapters 8, 9, Chapter 13, and the last one is primarily in Chapter 2, Chapter 6, and Chapter 15. Unfortunately, none of those are chapters we are going to discuss today or tomorrow. But I wanted to give you this list of departures that is identified in Chapter 1 and also in Part 7, which is actually where the justifications and long discussions of those departures and any associated exemptions would be.

The first one is pretty much an administrative item. There is a regulation that says that the COLA FSAR has to follow the organization and numbering of the DCD. In fact, there are a few places where that is very difficult for us and/or places where we need to add sections because of the requirements or the guidance, rather, of Reg Guide 1.206. So everywhere where we are different from the organization and numbering of the DCD, we have identified that with this standard departure, again, an administrative item.

The BLN 8.2-1, the transformer arrangement, we had a place, because of the way that

the left -- unless you have questions, I would rather not get into Chapter 8, Chapter 9, and Chapter 13 information at this time. We will discuss those with the various chapters as they come along.

MEMBER ABDEL-KHALIK: Going back to the previous slide, on Item 1.A, I think the best way perhaps for you to demonstrate to us this process is by indicating examples where this process has led to the identification of items in which there was conflict.

MR. GRANT: Certainly, and if you will go back again, or not back, I'm sorry, forward one slide, that bottom item down there, well, all four of those departures are examples of that information where we were looking at particular things in the DCD and we decided -- let's take the fourth one down, BLN 18.8-1, relocated the TSC.

The DCD indicates that the Technical Support Center that supports emergency functions is in a particular location within a building for an individual plant, because the DCD was originally written for single-unit plants. Well, all of our sites have ordered dual units. It is somewhat inefficient to staff, or not just staff, but to

outfit two sets of Technical Support Centers. So some of the sites, Bellefonte being one of those, have decided to move it out of that area and move it over into a specific area on its own.

So that is a departure from the DCD. We looked at it. We said, no, that doesn't work for us; we need to do something different. So we're going to make this departure.

MEMBER BANERJEE: So, say the wastewater monitoring system, is that a site-specific item? For example, tritium and --

MR. GRANT: Some of it is. Some of it is standard. But those portions that are site-specific, the DCD, we didn't have a departure because the DCD identifies those portions of the systems as conceptual design information.

MEMBER BANERJEE: Is it DAC or --

MR. GRANT: No. No, it's a little bit different. If you back up two or three slides there, I think it is, where we had the listing -- I'm sorry, right there. No, one more. No, the other way. I'm sorry. Right there.

You will see that, from the left-margin annotations, the last item there is CDI. That is a

place where the Design Certified Document identifies some information because they needed enough information to be able to say this is the way the design works, but we recognize that each plant might be a little bit different, but it is going to fit within these parameters.

If you look through the DCD, in particular Chapter 10, where some of this stuff might be covered, it is in brackets. That is the way they have identified this conceptual design information.

If you look through the regulation, you will see that conceptual design information is specifically called out as not Certified Design, not certified information.

So we, then, are allowed, through the processes and rules under Part 52, to go into that bracketed information and make it plant-specific. So we have provided some plant-specific information in that area, but it did not require a departure because it was conceptual design information in the DCD, one more little nuance of a way that is addressed under Part 52.

CHAIR RAY: Okay. Now the TSC is consolidated for both units, as you say?

MR. GRANT: Uh-hum.

CHAIR RAY: That brings to my mind the issue of turbine missiles, which are addressed in the DCD for a single unit, but are not resolved for a dual unit.

MR. GRANT: Yes, sir.

CHAIR RAY: Where is that addressed in the application at hand here? Is that in Chapter 10?

MR. GRANT: No, it is in -- well, there is a reference to it in Chapter 10. It is a minor reference. The actual evaluation of the hazard is in Chapter 3. So that will come up in the fall.

We do have a section in Chapter 3, 3.5-15 I believe it is, that talks about those dual-unit potential missiles from the opposite unit turbines.

CHAIR RAY: Right. Right.

MR. GRANT: So we have looked at that. We have determined that the probabilities are low enough that it meets the criteria.

CHAIR RAY: Right. We will get to that later.

MR. GRANT: Yes, in the fall.

CHAIR RAY: But my only point is that

that is another example of where the two units make a difference --

MR. GRANT: Yes.

CHAIR RAY: -- as compared to the DCD, and it has to be addressed on a plant-specific, site-specific basis.

MR. GRANT: That is quite correct, and I believe that is supplemental information. I would have to go back and look again, because it wasn't a COL item because it was a DCD single-unit approval.

CHAIR RAY: Right.

MR. GRANT: But when we look at the Reg Guide that asks for certain information for FSAR content, we know that when there are two units, that that is a piece of information that the staff will be looking for because the guidance says they will be. So we have added that information in. Again, it is in Chapter --

CHAIR RAY: Following your protocol, is that a departure or --

MR. GRANT: No, sir.

CHAIR RAY: No, it's not?

MR. GRANT: No, that would not be a departure. Again, it is supplemental information.

We have added to what is in the DCD to address the requirements for the COLs.

The last item --

MEMBER BANERJEE: This change is addressed in the DCD, I mean the amended one that you are now looking toward, Revision 17 or something, right?

MR. GRANT: The dual-unit turbine missiles?

MEMBER BANERJEE: Yes.

MR. GRANT: No, sir, they will not be. Again, the DCD continues to be Certified Design for a single unit, but the COL application is for a dual unit. So it will be addressed in the COL application.

MEMBER BANERJEE: Okay.

MR. GRANT: Although I will say I believe we do have a question on that, but I will let him address that when we get to Chapter whatever that is.

MR. SISK: Chapter 10.

MR. GRANT: Chapter 10. There is an item on that, on the DCD.

But we have addressed it in the COL. So I know it has been covered.

The final item here or the final slide or two is the open items for Chapter 1.

CHAIR RAY: Wait, wait. You didn't discuss exclusion area boundary atmospheric dispersion value.

MR. GRANT: Oh, I'm sorry. You won't actually see that one discussed much in the SER that you have in front of you because that is one of those things that is beyond Rev 1. I listed it on here to be complete.

There was a revision to the DCD, and we followed those revisions fairly closely and looked at those. When we looked at one of the more recent revisions, the Rev 17 revisions, we identified that, indeed, for the exclusion area boundary atmospheric dispersion coefficients, the CHI over Q's, there was one set of the exclusion area boundary CHI over Q's that was not bounded for the TVA site, for the Bellefonte site. So that resulted in us having to go do some plant-specific analysis using our site-specific CHI over Q's for that area.

Again, those are primarily discussed in Chapter 2, where the CHI over Q's are discussed, in Chapter 6, where there is an impact, and in Chapter

15, which is the actual dose calculations. So we will be covering that in more detail in the fall when we get to those chapters.

CHAIR RAY: Again, it is an environmental item that gives rise to a departure. We are pondering the way in which we have visibility to how that is identified. Now you have identified it here, so that makes it easy.

(Laughter.)

But if it has not been picked up on, is there any way to recognize that as what we are deliberating?

Okay, proceed.

MEMBER BANERJEE: In other words, what else is there?

(Laughter.)

CHAIR RAY: That's right.

MR. GRANT: The staff could help us with those when we get questions about things.

(Laughter.)

CHAIR RAY: I'm sure they do, but we have our role to play, too.

MR. GRANT: Absolutely. As Eileen and Stephanie indicated earlier, that is one of the

reasons why we are here, why we would like to talk to you early, to get that kind of feedback.

Open items that remain, there is an open item that will be standard, which is, as discussed earlier, to incorporate by reference the final DCD, whatever that might turn out to be, whatever revision, because we do identify it specifically by revision. Once it is approved, then we will need to come back in and do that. This is a tracking mechanism for the staff and for us to make sure that that gets done.

The second item is license condition criteria. I will let the staff talk more about that, but they are still looking at what criteria they are going to use for determining what things should be license conditions and what things might be acceptable just as commitments. So that is basically a placeholder for them to come up with criteria.

Interface content identification, we have provided information on our interfaces and where we have addressed the DCD interfaces. There's still a few questions outstanding on that. We are working with the staff to close those out.

I show both standard and Bellefonte-

specific there because we are still working through that. I would say at this point we are kind of leaning toward that being a Bellefonte-specific response that each of the COLAs would then have to address as well.

CHAIR RAY: Okay. How about some examples here? Interface content identification?

MR. GRANT: If we could back up and maybe provide some similarities, when we looked at COL information or looked at supplemental information, we provided those left-margin annotations in the various places to tell the staff where that information was being addressed. We did address the interfaces throughout the document, but we didn't specifically identify them in any way.

So what we have done recently is give them a table that matches up with the DCD table that identifies the interfaces to help them address or identify where in the FSAR those interfaces have been addressed.

That table gives them a section number. We still did not identify it with a specific LMA because in some cases it is COL information; in some cases it is supplemental information. So it was a

little bit difficult for us to figure out a way to do that. So we gave them the table. We are, again, working with them to make sure they understand what we've got there and how each of those items is being addressed.

We don't think there's a real technical issue there because we have addressed each one of those. If there is a technical issue, it will be identified in each one of the specific chapters.

CHAIR RAY: Thank you.

MR. GRANT: But this one is, again, pretty much administrative on where is it, help us find it kind of thing.

Regulatory Guide compliance, we had some questions about conformance on the Regulation Guides and various ones, and trying to make sure that the tables in Chapter 1 match up with the documentation of the Regulatory Guide conformance throughout the rest of the book.

Again, this one appears to be mostly administrative in making sure that those matches are maintained. We've got some issues there that we are working through and working with the staff to make sure they get the information again that they need.

And there is also the possibility, as they go through the remainder of the review, that they may have other questions about Regulatory Guide conformance. So, as those come up, we will address those.

That is the reason why it is both standard and Bellefonte. We are not sure what all those questions will be just yet. So it could be either one.

Construction impacts and operating units, the staff is looking at some criteria there to complete their review and what the acceptance criteria is. We have provided information with regard to the construction impacts.

The second one there on that page as well, to provide a positive statement of implementation timing, we are working on that statement. We think we understand what they need there, and we should be getting that to the staff very soon. Again, it should be a standard content.

The 1.4-3, perhaps --

CHAIR RAY: Does that include, by the way, construction of the second unit on the first unit?

MR. GRANT: That is exactly what it is, in fact.

CHAIR RAY: Well, at Vogtle it would be more than that, I would think.

MR. GRANT: It would be. The question between Vogtle and Bellefonte is the 1.4-3. When does that need to go into place, at what point during the construction? And the staff, again, is still working through, when does that need to take place? What kind of commitment do they need from us with regard to sites where there is already an operating unit?

For a site like Bellefonte, 1.4-4, for instance, where there is not an operating unit, but would be at some point, where you complete the first unit, in our case, Unit 3, and you're still working on Unit 4, well, it is obvious that the place to implement this program on construction impacts is at the time that Unit 3 goes into operation because there will be active construction on Unit 4 at that time.

Now when the COL, however, is issued on Vogtle, for instance, there will be operating units, but there won't be any active construction, or may

not be for some length of time. Some of that construction may not have potential to have an impact on the operating units.

So we are still working through exactly when do we need to implement that on plants that have currently operating units. That is part of the open item 1.4-3. I will let the staff talk more about that later. That is my best understanding of it.

1.5 is Part 30/40/70 licenses. In the old days, we would ask for those separately and get those ahead of the operating license under Part 50 because we would need to receive, possess, and use either source and/or some byproduct or special nuclear material on site, primarily sources. But we would get those ahead of the Part 50 license. So they would be asked for separately.

What we are trying to do here is make sure that the current COL application has all the necessary information that the staff requires in order to be able to issue those Part 30/40 and 70 licenses along with the Part 52 operating license.

So there were some questions about some of the information. Where is it? How does it address the Part 30/40/70 concerns?

Again, we are very close to having that completed, so that we can help the staff understand where that information is and get that review completed as well.

CHAIR RAY: Thank you.

MR. GRANT: Yes, sir.

CHAIR RAY: Serita, you have been waiting patiently.

MEMBER BANERJEE: Could I go back and ask a question, please?

CHAIR RAY: Yes.

MEMBER BANERJEE: With regard to the shape of the pressurizer, why didn't you change that? Was it the shape of the pressurizer or the surge lines?

MR. SISK: It was the shape of the pressurizer, but we will be talking about that shortly, yes.

MR. GRANT: If I might, one other item that I had on my list here that I forgot to address, it is not a slide, Joe. So go ahead with yours.

The confirmatory items, we talked about those a little bit. The vast majority of our confirmatory items, we have already written a letter

to the NRC and said this is the information we're going to put into the FSAR; here are the words. This is where we are going to put it.

They have agreed with that and said, yes, that is acceptable, and when you put that in, we will close this out. We are not going to talk about those because, again, those are all issues that have been agreed upon and done.

We have a couple of exceptions on that where there are confirmatory items that are of a different type. We will address those. Those will be addressed with Chapter 5 and Chapter 12, where those reside.

CHAIR RAY: Okay. I gave you my example of a confirmatory item. It wasn't absolutely straightforward, but anyway.

MR. GRANT: And where we have those types, we will cover those today.

CHAIR RAY: Okay.

MEMBER BANERJEE: Are you also going to address LOCA methodology today?

MR. SISK: No, LOCA will be addressed later on. It will actually be part of Chapter 15 discussions later.

MEMBER BANERJEE: So you just marked that as an item?

MR. SISK: Just marked it as an item.

MEMBER BANERJEE: Is it only the blowdown phase or are you also doing re-analysis of the long-term cooling phase?

MR. SISK: With regard to ASTRUM, we did a re-analysis.

MEMBER BANERJEE: But of just the blowdown phase?

MR. SISK: The whole thing.

MEMBER BANERJEE: The whole thing, including long-term --

MR. CUMMINS: I think it is just the blowdown phase. We have done some analysis on long-term cooling in support of sump screens --

MEMBER BANERJEE: Right.

MR. CUMMINS: -- because you have to know how much DP you can actually stand.

MEMBER BANERJEE: Okay, but that is going to be addressed in a separate meeting?

MR. SISK: Correct.

CHAIR RAY: All right, anything else on Chapter 1?

(No response.)

MR. GRANT: Thank you.

CHAIR RAY: All right, your turn, Serita.

MS. SANDERS: Good morning. My name is Serita Sanders, and I'm a PM for the Design Certification Amendment. I work for Eileen McKenna. I will be giving the portion for the CDA for Chapter 1 today, and Joe Sebrosky will give the portion for the Bellefonte COLA.

I would like to take this opportunity --

CHAIR RAY: Excuse me a second. I've got an administrative thing.

I am keeping close track of the agenda, and we will take a break.

MEMBER BANERJEE: What a task master.

CHAIR RAY: Well, I've got to march through here. We're actually supposed to end Chapter 5 before the break, but we won't get there. But I want, if possible, Serita at least to finish her part on Chapter 1.

MS. SANDERS: Oh, great. I will go quickly.

(Laughter.)

CHAIR RAY: I thought that would be a

consequence, yes. Thank you.

MEMBER BANERJEE: We are just one hour behind schedule or one and a half hours.

CHAIR RAY: You have to continue to excuse us. It's 10:30 and we are almost to the end of item 3, which is supposed to be done at 10:00. So we're a half-hour behind.

MS. SANDERS: I will only take a couple of minutes.

CHAIR RAY: But this has been a good discussion. I have thought it was worth having.

Go ahead, Serita.

MS. SANDERS: I would like to take this opportunity to acknowledge the staff, the staff review team that is. We have the technical staff for the COL, which is Stephen Koenick, Eric Oesterle -- I really practiced this name -- Michael Dusaniwskyj, and Richard Pelton, and for the project managers for the COL, it is Joe Sebrosky for Bellefonte and Sujata Goetz, and for the DCA, I'm the Chapter 1 project manager, but I would be remiss if I did not acknowledge David Jaffe, who is a major contributor to the development of Chapter 1.

We just provided you on this slide with a

brief overview of the DCA and the COL. It is a summary of the open items. You can compare the Design Certification Amendment to the COL. That was the purpose of this slide.

Next slide, please.

For this slide, it gives you an overview of the DCD and the DCA. As mentioned earlier, they talked about changes, and we just simply stated where there were no major changes and where there were conforming changes to the DCD versus the DCA.

Next slide.

Chapter 1 provides the context of the Supplement 2 of NUREG-1793. It helps explain to anyone that reads the NUREG, collectively, what is the scope of the review. The organization of the chapter illustrates the key functions.

As you can see, you have an historical perspective, summary, information generic to all SERs, and two open items. With the historical perspective, you have a chronology, and in that chronology we identify important correspondence, and to the application we cited the milestones, but we also considered, as stated earlier by Westinghouse, that there are a lot of players involved in the

development of this. We are all new; a lot of us are new PMs. A lot of people are new from Westinghouse.

It gives a chronology from when the application was tendered back at March 28th, 2002, all the way through September 22nd, 2008, when Westinghouse submitted the Revision 17. So it gives a great historical perspective in Chapter 1.

We also have a summary, not as extensive as Westinghouse, but Chapter 1 also points you to other things in the chapter, so you can have the summary of the design changes and you can, in subsequent SERs, read what the changes are.

Then it also helps with the organization of the SERs. In the generic piece, it is information that you will see repeatedly through every chapter of the DCA.

So, lastly, we have the open items, which Westinghouse talked about earlier. We generated those open items as to make sure that in the final that all tables, figures, and Reg Guides are consistent.

If there are no questions, that concludes my presentation.

CHAIR RAY: Okay. That was brief and to

the point. Thank you.

I've got one question, though, which I'm going to ask now, just so I can calibrate myself. Looking ahead beyond the section in this package that we have on the hard copy, Chapter 1 is followed by a staff presentation on Chapter 4, but I don't see that on the agenda here today.

MS. McKENNA: Chapter 4 is actually on the agenda for tomorrow.

CHAIR RAY: Okay.

MS. McKENNA: When we were putting the agenda together, we kind of looked at times, of sizes of chapters and availability of people. So this is probably the major exception, where we are out of sequence, although I think there's another.

(Laughter.)

CHAIR RAY: You're actually in sequence, Eileen, because 1, 4, 5, that's in order. It is just I wanted to ask if I had missed something. Okay.

Well, we were to complete our review of Chapter 5 before our break, but given that it is five minutes to go --

MS. COFFIN: Mr. Ray, we still have a presentation to do.

CHAIR RAY: Yes, I understand. All right. I left off Joe. Sorry, Joe.

(Laughter.)

MR. SEBROSKY: Oh, that's okay.

CHAIR RAY: Serita, I was made so nervous by Sanjoy's worrying about the coffee break that I speeded us up too much.

(Laughter.)

So go ahead, Joe. Thank you.

MR. SEBROSKY: My name is Joe Sebrosky. I'm Lead Project Manager for the Bellefonte Safety Review, and I work for Stephanie Coffin.

The purpose of this slide is to show you -- and, actually, there's 11 parts to the application -- but it is to show you, for the Bellefonte application, where the different parts of the application are dispositioned in our SER.

So the Safety Evaluation Report for Chapter 1 has, if you look at the first three sections, 1.1 through 1.3, it talks about the 11 parts of the application, and it provides a roadmap for how those things are dispositioned in our Safety Evaluation.

So, for example, if you look at Part 1,

it is the general administration information and financial information. The financial information is actually reviewed in Section 1.5.1 of the Safety Evaluation.

Part 2 of the application is the Final Safety Analysis Report. For the most part, that is evaluated on a chapter-by-chapter basis. So you will find Chapter 2 FSAR information evaluated in Chapter 2 SER chapters.

The Environmental Report is Part 3 of the application. That is being addressed by the environmental PMs, and the product that is going to look at that is the Final Environmental Impact Statement.

The tech specs are discussed in Chapter 16, the emergency plan, and in Chapter 13. There is no limited work authorization for Bellefonte. So that is not applicable.

Part 7 is something that Eddie alluded to earlier. It is the departures report. It gives much more detail and the justification for each departure. You won't find that kind of information typically in the FSAR.

Part 8 of the application is the security

plan. There will only be a summary description provided in Chapter 13 in the SER.

Part 9 in the application has withheld information. Some of the proprietary information, for example, is some of the financial information. You will see that in Part 9 in the non-public version of the document. The public version, you won't see that.

Part 10 of the application contains the proposed license conditions. It includes ITAAC, and there's some license conditions we will talk about in a little bit.

Part 11 in the application, it is actually on your handouts; it is not on this particular slide. But Part 11 of the application has the TVA Quality Assurance Program description. That is evaluated in Chapter 17 of the Safety Evaluation Report.

So the purpose of this slide and the purpose of the discussion in the SER is to provide a mapping of the different parts of the application and how they were addressed by the staff.

MEMBER BANERJEE: Does the ITAAC also contain the DAC?

MR. SEBROSKY: The ITAAC incorporates by reference the ITAAC from the Certified Design.

MS. McKENNA: This is Eileen McKenna.

The DAC are a subset, if you will, of ITAAC. They are within --

MEMBER BANERJEE: Yes, so they are included?

MEMBER BROWN: What chapter is that in in the DCD?

MS. McKENNA: The ITAAC are actually in Tier 1 of the DCD, which has a separate numbering different from the Chapter 1 through 19 that we have in the Tier 2 and the FSAR.

MR. SEBROSKY: The Emergency Planning ITAAC, which are unique to Bellefonte, you will find them in Part 10 of Bellefonte's application. So Part 10 of the application for Bellefonte incorporates by reference the Design Certification ITAAC, which Eileen said are Tier 1 material, and also, it includes the Emergency Planning ITAAC, and it also addresses other systems that potentially could have ITAAC.

One of those, for example, is offsite power. We may end up with ITAAC on the offsite

power.

So that is where you would find the ITAAC that are outside the scope of the Certified Design.

On slide seven, Eddie alluded to this. He discussed the departures and the exemptions. As I said, Part 7 of the application provides much more detail on the justification for those departures and exactly what they are departing from or what they are requesting exemption from.

The only thing that I would clarify is the exclusion area boundary, the ACRS members have Revision 1 of the application. So Revision 1 of Bellefonte incorporates by reference Rev 17. The CDs that I have provided to Mike earlier for the members have links. So, when you go -- Eddie alluded to the fact that when you look at any particular chapter, the first section will say we incorporate by reference. Well, if you click on that link, you are going to go to the public version of Rev 17.

What we describe in Chapter 1 of our Safety Evaluation Report is that, for the most part, we are basing our Safety Evaluation Report on that Revision 1 of the application. There are some supplemental information that we also intend to

address in the SER. The exclusion area boundary exemption request came in the form of an RAI response that was after Rev 1. But we intend to evaluate that in our SER that we are going to provide to the Committee.

So in Chapter 1 we also provide a mapping of where the departures and the exemptions are discussed in the SER. We issued Chapter 1 before we issued all the other chapters. Typically, Chapter 1 would be a rollup that would be done at the end.

Some of that mapping may change. For example, the Technical Support Center, we mention that it will be in Chapter 18. That is where the departure came from, but the departure will probably also be discussed in Chapter 13 for the Emergency Plan. It may also be discussed in Chapter 9 because the ventilation system for the TSC used to be supplied by the normal ventilation system for the plan, and it was filtered. So the fact that they are moving that, we may discuss that in Chapter 9. We haven't completed that mapping. We won't do that until all the SERs are done.

So the purpose of this slide was, again, to let you know about Part 7 of the application and

to let you know in Chapter 1 we attempted to provide a roadmap for where the various departures and exemptions would be discussed.

This next slide, we are going to try, you will see in the additional presentations, we are going to provide a slide like this in each one of the chapters. It is meant to try to give the Committee an idea of the reliance of the Safety Evaluation Report on how much of it is incorporated by reference, how much of it is standard, and how much of it is site-specific.

So let's back up. The Safety Evaluation Report for all the COLs, Bellefonte, Vogtle, any of the seven plants that may get to that stage, is going to support the license for that particular plant. So in that Safety Evaluation Report, in each section we try to provide a mapping for how the various things are evaluated.

So, for example, the incorporated by reference, what you will see in our Safety Evaluation Report is a pointer to eventually the NUREG 1793 supplement that Eileen is working on.

If you look at the standard information, it tries to, similar to the left-margin annotation

for what the applicants are doing, our SERs try to identify what is standard and what is site-specific. The idea is that, when we get to the S-COLs, for the S-COLs, they will point back; for the stuff that is within the scope of the Certified Design, the SER is going to point back to the NUREG that talks about the Design Certification. For the standard information, it is going to point back to the R-COL, how that information was reviewed under the R-COL. For the site-specific, it is going to provide a detailed evaluation for the site-specific.

So in this slide, and you will see it with Chapter 5, we try to identify the standard and site-specific content. It gets back to the discussion that we had earlier today.

So, for Bellefonte, the SER is going to support the Bellefonte Combined License. The same thing for Vogtle, and the same thing for V. C. Summer. What you are going to see, though, for each one of those SERs is, under the Design Center Working Group approach, you are going to see pointers and credit being taken for previous reviews, if that makes sense.

So this slide, if you look at 1.1, it

mentions that there is some incorporated by reference material, there is some standard material, and there is also site-specific. If you look at our SER, we try to break out the standard information and the site-specific information and provide an evaluation on each one of those on an individual basis.

The idea is that we do that so that we can point back and take advantage of that in the next COL evaluation.

So, if you look at 1.3 and 1.5, they are completely incorporated by reference. In our Safety Evaluation, what we say is we have looked at 1.3 and 1.5, and we agree that it is appropriate to incorporate those sections by reference and, furthermore, there isn't anything else that we think needs to be provided in those sections for us to make a safety determination that will provide the basis for issuing the Combined License.

You will see that consistent language throughout all our SERs.

The other thing that you will see, as we talk about the other chapters, is a highlight of the areas that we think may benefit from review from the ACRS. In this particular slide, we have highlighted

1.8, 1.9, and 1.10. Not only do we intend to talk about the open items, but there's some issues in those chapters that are resolved by the staff, but may be of interest to the ACRS.

So these open items are the open items --

CHAIR RAY: You said, "in those chapters". Do you mean in those sections of Chapter 1?

MR. SEBROSKY: Well, I guess what I meant to say is, for my presentation, I intend to talk about 1.8, 1.9, and 1.10, not only the open items, but issues that may be of interest to the ACRS for Chapter 1.

You are going to see the same kind of format when we go to Chapter 5; we have that kind of discussion.

So these are the open items that Eddie went through. I am not going to reiterate the open items. But what I would point to is Eric Oesterle is sitting next to Stephanie Coffin. He helped with Chapter 1.

There are three items that we are developing staff guidance for. 1-2 is the staff to determine the FSAR commitments, which FSAR

commitments require a license condition and which ones are appropriate as an FSAR commitment; how you delineate between what is a license condition and what is acceptable for an FSAR commitment, and the guidance for that is something that Eric is developing, and he intends to promulgate through an ISG. That is more for the staff than it is for industry. It will let our stakeholders know the process that we are going through to make that determination.

The other one that I would point to, and that Eddie alluded to, is the construction. The 1.4-3, staff, the complete review of the applicant's assessment of the potential hazards. Eddie alluded to one of the issues.

One of the issues is, when you have a green-field site, it is pretty easy to say for the second unit the management programs need to be in place when you make the finding to support fuel-loading on the first one. But when you have operating units, when do those management programs need to be in place?

The other thing that the ISG is going to do is, if you look at the application, it goes

through an assessment of the hazards and it goes through the risks associated with that, and then it provides management programs to mitigate that.

If you look at the North Anna application and you look at Bellefonte, it is mostly standard information. The issue is whether or not those programs are appropriate. That is something that we are going to use to judge across Design Centers. So the office instruction is going to help with that.

The last item is 1.5-1, and you will see that the open item is only related to the 10 CFR 30 and 40. It is not to the 10 CFR Part 70.

We indicate in Chapter 1 of the SER that there's enough information, the staff has enough information to evaluate whether or not it is appropriate to provide a Part 70 license. That is for new fuel, for example.

So, if you look in various parts of the application, you will see a discussion of the security programs that need to be in place with the receipt of new fuel onsite. You will also see fire protection elements.

So the staff believes that there is enough information to make a judgment about the Part

70. We are still not sure about the Part 30 and the Part 40 portions of it. So that is the purpose of that open item, and Eric is working on the guidance for that.

This last slide, there aren't open items necessarily tied to these, but it is some information that we wanted to bring to the ACRS's attention.

The financial qualification review is done in Chapter 1. Mike Dusaniwskyj from NRR is the reviewer that did that. It evaluates the resources to build, operate, and eventually decommission Bellefonte 3 and 4.

It is a little different; North Anna has that in an appendix for Bellefonte. We have that in Chapter 1.

The second bullet was alluded to earlier, about the reinstatement of the construction permits for Bellefonte 1 and 2. We have a writeup in Chapter 1 that discusses NRR has reinstated the construction permits for Bellefonte 1 and 2, and you heard TVA say earlier that they have infrastructure from 1 and 2 that is used in the 3 and 4 application, the cooling towers, the switchyard, the intake structure.

In addition, there's things like the

Emergency Plan, the Security Plan. They are based on Unit 3 and 4, not 1 and 2. The entire application is based on 1 and 2 not being built.

So what we provide in Chapter 1 of the SER is a discussion that, if they do decide to go forward with building Unit 1 and 2, the design basis for Unit 3 and 4 is going to change. The timeframe for TVA's decision is such that it will be done before -- a decision will be made on Unit 1 and 2 before we would be granting a license on 3 and 4. So, one way or another, we will know the outcome.

Bullet No. 3, COL holder items, if you go to Part 10 of the application, what TVA provides is a list of COL information items that come from the Design Certification. So what they are required to do as part of the COL is address all the COL information items that are in the Design Certification. There are a subset of those information items that will not be addressed until after the COL is issued.

So what TVA proposes in Part 10 of the application is COL, they call them "holder items", in that they propose that those be license conditions in the license.

What you are going to see in our SER is a discussion that follows a format, and right before we make the conclusion in the SER there's a discussion about post-COL commitments. What we evaluate in the SER is whether or not it is appropriate to defer that COL information item to after the COL is granted.

We are not sure at this point if we are going to have it as a license condition or an FSAR commitment, but what Part 10 of the application does is it gives you an idea of the list of items that is proposed to be deferred until after the COL is issued.

An example of that would be the spent fuel coupon monitoring program. That is something that is listed as a COL holder item.

The last item on this list is operational program implementation. There's two license conditions that talk about operational programs. An example, radiation protection program, fire protection program. So, at a high level, those programs are described and we make a finding on those high-level descriptions as to whether or not it is appropriate to grant a license.

What you see in Part 10 of the

application are license condition 3, which provides a milestone for when that program needs to be implemented. So, for example, the security program, there's parts of that security program that have to be implemented before the receipt of new fuel onsite. The fire protection program, there's parts of that that need to be implemented before the receipt of new fuel onsite.

So there's milestones associated with those operational programs that are provided as a proposed license condition 3 in Part 10 of the application. Then you also see another license condition 6, which that license condition basically says we have the milestones established in accordance with license condition 3; license condition 6 requires periodic updates. It states that, within 12 months of granting the COL, Bellefonte will provide a detailed schedule for those milestones, when they expect those milestones to be achieved, so that we can plan accordingly with our inspection resources. It requires that to be updated on a six-month basis.

So, again, the purpose of this slide was to highlight areas that don't necessarily have open items that may be of interest to the ACRS.

CHAIR RAY: Are there questions for Joe?

MR. OESTERLE: This is Eric Oesterle from the staff. I just want to add something to provide some clarification.

If there is any information that is the subject of the COL holder item or action item that the staff needs to make their determination on issuance of the license, that information cannot be deferred until later. So we are looking at information like updates of information that would update the FSAR or other licensing basis documents or information that the licensee would notify the NRC of in terms of schedules, of implementation of certain programs, or completion of engineering or design work for DAC, to let us know when they will be ready for us to come and take a look at it, to inspect it, things like that.

So I just want to make that clear. There will be no information necessary for the staff to make a license determination that will be deferred.

CHAIR RAY: Well, I noticed that, for example, in one case, DAC, an open item was created to answer the question, when will this be done? That is the kind of thing you are talking about.

That is an open item in Chapter 10.

Anything for Joe before we quit?

(No response.)

Okay. We were due to take a break at 10:45. It's 15 minutes late. We will break until 11:15, but before, I want to alert everybody that we may only get through the applicant portion of Chapter 5 before lunch because we will try to take a lunch break on time. The staff may, therefore, be after lunch, as opposed to before lunch, as shown here. We will see.

Anything else?

(No response.)

11:15.

(Whereupon, the foregoing matter went off the record at 11:04 a.m. and went back on the record at 11:16 a.m.)

CHAIR RAY: We will come back to order, please, and pick up with, roll our sleeves up, and get to work on a technical chapter, Chapter 5.

Rob, I guess you're going to begin, is that correct?

MR. SISK: Well, actually, I will introduce John Deblasio, Licensing Lead for Chapter

5, and Mr. Dale Wiseman, our Technical Lead. I will let John walk us through the presentation.

MR. DEBLASIO: Okay. Basically, Chapter 5 is an overview of a reactor coolant system. It is broken up into four parts. It is the reactor coolant system and connected systems, the integrity of the reactor coolant pressure boundary, the reactor vessel, and the reactor coolant system component and subsystem designs.

Under those four areas, the overview covers design basis, major components, system performance and flows, and PNIDs. Under the pressure boundary, the ASME code compliance with 10 CFR 50.55(a), code cases, overpressure protection, pressure boundary, materials, ISIS of Class 1 components, leakage detection through pressure boundary and water chemistry.

Under the reactor vessel, it addresses in the DCD design basis and design materials, including surveillance, PT curves, ISI, and insulation.

Under the last major heading of Chapter 5, components, it addresses RCP, steam generator, loop piping, main steam flow restrictors, pressurizer, ADS valves, RNS valves, pressure-relief

devices, component supports, pressurizer relief discharge, and high-point vents for CMT PRHR heat exchangers.

The next slide is really the meat of the chapter. We identified nine major changes since the Design Certification, which is a little bit of a misnomer. When we were looking at these last night, we determined, out of the nine, there are really three major changes. The other six that are changes are more significant than very minor changes, but they are not major.

(Laughter.)

Anyway, the three major changes that we identified was the reactor coolant pump design, which encompassed the revised heat removal design and the flywheel material change; the pressurizer configuration control, and the reactor vessel changes relative to the addition of a flow skirt, and reduction of in-core instrumentation for head penetration.

I was going to talk about those three. If you want to hear anything about the additional ones, we could address that as well.

But, first, the reactor coolant pump

design, the revision to heat removal --

MEMBER ABDEL-KHALIK: Excuse me.

MR. DEBLASIO: Yes.

MEMBER ABDEL-KHALIK: The relocation of the instrumentation, what is the motivation for that?

MR. DEBLASIO: I will turn to Dale for that one.

MR. WISEMAN: This is Dale Wiseman from Westinghouse.

The instrumentation, the narrow-range hot leg temperature instruments were moved downstream of the pressurizer because of concerns about measuring out-surge from the pressurizer into the hot leg.

There was also a wide range --

CHAIR RAY: Excuse me a second. It says upstream.

MR. WISEMAN: Yes, it was moved upstream. I'm sorry, I'm looking at the wrong, the Rev 16 figure. The Rev 17 figure has them upstream, so that the out-surge from the pressurizer does not impact the temperature measurements.

There is also a wide range hot leg temperature that was moved upstream of the passive RHR heat exchanger connection, so that during an

accident scenario, when cooling is being provided by the passive RHR, it gives the good indication of the temperature coming out of the reactor vessel and going into the passive RHR.

MEMBER BROWN: Was that just based on an analysis? Was that just based on analysis or you just look at it and say, "Well, gee, we ought to move it farther away."?

MR. WISEMAN: I think this was based on an engineering evaluation. I wouldn't say it was a detailed analysis. It's engineering evaluation when we looked at what we would be measuring in the location that we had them in and what would be a preferable location to get the specific information that we were looking for.

MEMBER BANERJEE: Now have we finished with that item or are you going to talk about the zinc?

MR. DEBLASIO: We can summarize all of them.

MEMBER BANERJEE: Well, okay.

MR. DEBLASIO: I was planning on originally hitting the three bigger ones first.

MEMBER BANERJEE: Pick whatever, and then

I want to hear about the zinc.

(Laughter.)

MR. DEBLASIO: So the first one that I started to talk about was revisions to heat removal incorporations of the external shell and the tube heat exchanger and stator cooling jacket. This change eliminated the heat exchanger design that originally wrapped around the stator.

As the pump design was finalized, because we were still into design finalization, the pump heat removal requirements were increased, which meant that the wraparound design was not a practical design. So we made modifications.

The next one under the wrap, the coolant pump design, was --

MEMBER BANERJEE: Does this allow you to procure pumps from different vendors or is it for a specific pump?

MR. WISEMAN: This is Dale Wiseman again.

No, this is still a single-pump design. This heat exchanger, it is just the implementation of the heat removal from that specific reactor coolant pump.

MEMBER BANERJEE: So if anybody wanted to

get a different pump, they would have to file some sort of a deviation then?

MR. WISEMAN: Yes, that is correct.

CONSULTANT KRESS: These are what, can motor pumps?

MR. WISEMAN: Yes, these are can motor pumps.

CONSULTANT KRESS: So you eliminate the pump seal LOCAs? That is probably a good idea, but I don't think there is a lot of vendors out there that make can motor pumps.

MEMBER BROWN: Who is the vendor for this one?

MR. WISEMAN: Curtis Wright.

MEMBER BROWN: Curtis Wright. EMD?

MR. WISEMAN: EMD, yes.

MEMBER BROWN: Okay.

CONSULTANT KRESS: This flywheel, is that a bimetallic, I understand?

MR. DEBLASIO: Yes. The major change there was the retainer ring is the ring that holds the tungsten alloy insert was changed to reduce sensitivity to hydrogen-assisted stress corrosion and cracking. The revised material was 18/18, 18 chrome,

18 manganese, alloy material which was developed for rotating parts in generators, due to resistance to SCC. So the original material was nickel marange steel, which is a high-strength steel. So we went to an improved material.

CONSULTANT KRESS: Did you have to do a missile analysis for that?

MR. DEBLASIO: Yes.

MR. WISEMAN: Yes. This is Dale Wiseman again.

We did redo the missile analysis with the new materials. That was just completed, and if it hasn't been submitted, it will be submitted within a few days.

MEMBER ABDEL-KHALIK: Is there any change in the inertia of the flywheel as a result of the change in the material? Or are these materials pretty much the same density?

MR. WISEMAN: The change in the flywheel retainer ring, when we changed materials, the material that we are now using is a lower strength. So the thickness of that material increased slightly. To maintain the overall envelope of the flywheel, the tungsten inserts decreased slightly. So there

was a very slight change in the inertia.

MEMBER ABDEL-KHALIK: In which direction?

MR. WISEMAN: Less inertia. If you plot the coastdown of the pump with the new flywheel material versus the original retainer ring material, the change is so slight that you can almost not distinguish the curves. So there is a slight reduction, but we still have margin to the safety analysis inputs.

MEMBER BANERJEE: The rundown is different than a blowdown, for example. Slightly?

MR. WISEMAN: This is the in the loss of power, loss of flow condition, yes.

MEMBER BANERJEE: But you still have the pump rundown during blowdown, right?

MR. WISEMAN: When you say, "rundown", they do coastdown.

MEMBER BANERJEE: Yes, well, call it whatever, yes.

MR. WISEMAN: Yes. During a LOCA, because they are tripped whenever the core makeup tanks come on, that does occur during a LOCA, although that is not the major input to the LOCA analysis. The coastdown, the importance of the

coastdown, is really in the loss of power or loss of flow event.

MEMBER BANERJEE: But in the LOCA, it doesn't make any difference in your analysis?

MR. WISEMAN: Well, we are including that in the --

MEMBER BANERJEE: The revised --

MR. WISEMAN: -- revised Safety Analysis.

MEMBER ABDEL-KHALIK: When you say that there was a slight change in inertia, and consequently, there was a slight change in the coastdown characteristics of the pump, what is slight?

MR. WISEMAN: I can provide the exact numbers. I just need to look them up here. Maybe over lunch I can provide that.

MEMBER ABDEL-KHALIK: Thank you.

CHAIR RAY: Now the change that you are talking about isn't contrasting with the depleted uranium. So you're talking about 17 versus 16 as opposed to 17 versus 15, correct?

MR. WISEMAN: Yes, that is correct.

CHAIR RAY: All right.

MR. WISEMAN: Yes. We had already

changed to tungsten alloy from the depleted uranium --

CHAIR RAY: All right.

MR. WISEMAN: -- in 15.

CHAIR RAY: And we will come back to the missile discussion later, but you say that has just been completed and submitted?

MR. DEBLASIO: I don't know if it has been submitted yet.

MR. WISEMAN: Yes, I'm not sure it has been submitted from Westinghouse, but it is ready to be submitted.

CHAIR RAY: Okay.

MR. DEBLASIO: Okay. The next one was the pressurizer configuration change. This is where we went from the original pressurized design, which did not result in favorable seismic loads relative to the movement of the ADS. The revised design was decreased in height and increased in the diameter. The net result was the volume was unchanged from the original design, which reduced the seismic loads of the ADS valve package on the top of the pressurizer. This reconfiguration provided acceptable results relative to our revision to the design.

MEMBER BANERJEE: Now, if I remember, I wasn't a member, but a consultant at the time the AP1000 was certified, you had this sort of chugging behavior during loss of coolant accidents where you got dump and oscillatory sort of phenomenon. This was also seen in experiments with a specifically-scaled pressurizer of whatever height you had.

Now does that change that type of behavior, the shape of the pressurizer?

MR. CUMMINS: No. This is Ed Cummins.

We did do the safety analysis over again, and there was essentially no change in the results of the safety analysis from the pressurizer decrease in size.

MEMBER BANERJEE: Yes, I guess that oscillatory behavior was not caught by any of the codes, was it?

MR. CUMMINS: Right.

MEMBER BANERJEE: But it was a very characteristic phenomena, if I remember. It would dump and fill.

MR. CUMMINS: Yes. I mean there is reason to have counter-current flow there.

MEMBER BANERJEE: Yes.

MR. CUMMINS: The break wants the flow to come out, and the venting wants the flow to go up. So there is an effect of the pressurizer.

MEMBER BANERJEE: Yes, but that difference doesn't affect that?

MR. CUMMINS: No, and the times that we were worried about it, when you were reviewing it, is how that affected ADS-4 because the ADS-4 could get some flow from the pressurizer. The ADS-4 was really what we were studying hard because it really controlled the safety after it opened. So that is near the end of the pressurization.

MEMBER BANERJEE: This effect is very minor?

MR. CUMMINS: Very minor.

MEMBER BANERJEE: So the overall height is not affected that much, if you take the surge lines and everything into account?

MR. CUMMINS: The height of the pressurizer was decreased by, I think, 12 feet. Maybe it was 15 feet. So the top of the pressurizer was lowered by about 15 feet.

CONSULTANT KRESS: I think this oscillatory behavior, as best I remember, was never

predicted by any of the codes.

MR. CUMMINS: Right.

CONSULTANT KRESS: And I don't think they have redone the tests with the new height pressurizer. So I don't know how you would know whether it has affected this behavior.

MEMBER BANERJEE: The concern, as Ed pointed out, was water chugging into the ADS line and reducing its effectiveness.

CONSULTANT KRESS: Yes.

MEMBER BANERJEE: So when reducing the height, if anything, I mean if we did a back-of-the-envelope calculation, it would suggest that there would be less --

CONSULTANT KRESS: Less opportunity.

MEMBER BANERJEE: -- yes, opportunity, for that to happen. But, again, I think it is a point that needs an evaluation, just to reassure us that this doesn't change things.

Because I think the tests that were done in -- was it Rosa 4? -- yes, was the same whatever your height was at that point, yes.

MR. CUMMINS: This is Ed Cummins.

We were planning to talk about that when

we talk about Chapter 15.

MEMBER BANERJEE: Okay.

MR. CUMMINS: We will add that to our list.

MEMBER ABDEL-KHALIK: Now, by changing the aspect ratio of the pressurizer, have you maintained the same gas space and liquid space volumes?

MR. CUMMINS: Ed Cummins again.

Not exactly. I think that the behavior is often controlled by the volume, but there are some things that are controlled by the relative level. So we wanted to achieve similar relative levels. So what we did was use shorter heaters, so that we could be lower, and so we would have the same control band, not exactly the same, but almost the same, the same control band in terms of level that we had before.

CHAIR RAY: All right, proceed.

MR. DEBLASIO: Do you want to say something?

MR. WISEMAN: This is Dale Wiseman again.

Just to give you those inertia numbers, the original inertia numbers that we had were 23,519 pound-foot squared, and with this material change,

the inertia was reduced to 23,107 pound-foot squared.

CHAIR RAY: But are you comparing now again 15 to 17 or 16 to 17?

MR. WISEMAN: No, this is tungsten alloy 15 with marange steel retainer ring 15 to tungsten alloy 18/18 retaining ring in Rev 17.

CHAIR RAY: Now let's start again. The Certified Design is depleted uranium flywheel.

MR. DEBLASIO: I don't know. I don't think so, but --

MR. WISEMAN: No. I believe --

CHAIR RAY: All right. Well, then I'm not reading what is in the NCR here. We will get to the stats later.

MR. CUMMINS: Ed Cummins.

We did have depleted uranium at some stage in the passive plant development. Where we ended up in Revision 15, we had better look up.

MR. WISEMAN: We will check.

MR. CUMMINS: Yes.

CHAIR RAY: All right. In any event, the requirement is for the coastdown to not violate the curve that is assumed in the analysis, as I recall.

MR. WISEMAN: Right.

CHAIR RAY: These pumps weigh 100 tons. That is not a small machine.

MR. WISEMAN: Yes.

CHAIR RAY: Anyway, go ahead.

MR. DEBLASIO: Okay. The next change was the reactor vessel changes.

MEMBER ABDEL-KHALIK: So, back to the pressurizer change, if you don't mind, you indicated that there was a slight change in the pressure control band?

MR. CUMMINS: Ed Cummins again.

No change in the pressure control band, but in the control scheme the setpoints for charging and the setpoints for stopping charging and spray, all those things are redone, and they are slightly different than --

MEMBER ABDEL-KHALIK: And backup heaters?

MR. CUMMINS: The same thing. All those things that are setpoints based on pressurizer level that are for control functions were changed slightly, but almost none.

MEMBER ABDEL-KHALIK: So the control band remained the same?

MR. CUMMINS: Very similar, yes.

MEMBER ABDEL-KHALIK: So, as far as selecting initial conditions for various safety analysis scenarios, that hasn't changed?

MR. CUMMINS: That hasn't changed. Usually, you start at either the high-level setpoint or the low-level setpoint.

MEMBER ABDEL-KHALIK: Okay, thank you.

MR. DEBLASIO: Okay. The reactor vessel changes that were made were an addition of a flow skirt, which was a perforated cylindrical attachment which was added to the lower head of the vessel. The purpose was to provide a core flow inlet distribution that would provide minimum crossflow between the fuel assemblies. This will minimize crossflow loads and flow-induced vibration loads.

MEMBER BANERJEE: Does this improve mixing in the lower plenum or what was the purpose?

MR. WISEMAN: This is Dale Wiseman.

The purpose of flow skirt was to direct the flow into the more peripheral assemblies, so that the overall distribution into the core was more uniform. That was its major intent.

MEMBER BANERJEE: What does this do to, say, boron mixing and things in the lower plenum?

Does that have any effect?

MR. CUMMINS: No. Ed Cummins.

No, I don't think so. I know we did analysis of breaks and things, and the results were essentially the same. We provided those results to the staff. Where you could get flow backwards through this, we were concerned that maybe it would have an impact, and it didn't.

The driving force for this is the fuel criteria has, for protection of the fuel from fretting and wearing, has very tight criteria on even distribution of flow to the fuel elements. And some of that is done by the six support plates.

But when we did analysis of this, we couldn't prove to the fuel people that we would meet the flow distribution that they required. So we added this to improve the flow distribution.

MEMBER BANERJEE: Did you do some CFD?

MR. CUMMINS: We did, yes.

MEMBER BANERJEE: Yes. What did you use?

MR. WISEMAN: This is Dale Wiseman.

I think we were using CFX at that time.

CONSULTANT KRESS: Did this change in flow distribution affect the plant temperature during

the hot -- did it affect hot channel factors? It seems like you are reducing the flow to it.

MR. CUMMINS: Ed Cummins.

I guess, in actuality, it reduced the hot channel factors by making it more even, but I think that none of those were based on the predicted CFX flows. So where we get the hot channel factors, I don't actually know from old history of factors of safety.

MEMBER ABDEL-KHALIK: So what is the ratio between the peak and average bundled inlet flow with and without this skirt?

MR. WISEMAN: This is Dale Wiseman.

The issue we were having was in the peripheral assemblies, where I think our analyses were showing 65 to 75 percent of nominal in the periphery. We want to be above 85 percent.

MEMBER BANERJEE: Do you have a sketch of this?

I'm sorry, go ahead.

MEMBER ABDEL-KHALIK: Well, I was just trying to ascertain, No. 1, the need for and the effectiveness of this skirt in eliminating lower plenum anomaly.

MR. WISEMAN: The skirt was not specifically looking at lower plenum anomaly at all.

MEMBER ABDEL-KHALIK: But, nevertheless, the purpose is to provide a more uniform inlet flow to the various assemblies. And the question is, what is the ratio between peak and average assembly inlet flow before and after implementation of this design change?

MR. WISEMAN: I would have to get back to you on what those exact numbers, peak to average.

MEMBER ABDEL-KHALIK: And minimum to average.

CONSULTANT KRESS: I am trying to picture what this skirt looks like.

MR. CUMMINS: Ed Cummins.

So maybe I will try to describe the skirt. It is a cylindrical plate that is in the downcomer. It is at the bottom of the downcomer. It is really mounded, it is welded to the bottom of the reactor vessel. So there is a little gap at the top of the plate between the downcomer and the plate.

And the cylindrical plate goes to the diameter of the core, and it has holes drilled into that. The holes are --

CONSULTANT KRESS: The full diameter of the core?

MR. CUMMINS: Yes, it's a cylinder with a diameter of, say, the tube support plate, a little bit greater than the tube support plate. So the water comes in and goes through these holes and then up into the bottom of the fuel.

MEMBER BANERJEE: How big are these holes?

MR. CUMMINS: Less than an inch. They were different sizes.

MR. WISEMAN: This is Dale Wiseman.

They are in the range of three-quarters of an inch, I think, but there are, I think, two different sizes.

CONSULTANT KRESS: Do you think GSI-191 would be involved there?

MEMBER BANERJEE: No, the holes are too big. They would be okay on that.

MEMBER ABDEL-KHALIK: If the purpose is to reduce the extent of crossflow, so that you can reduce rod fretting, et cetera, that would be affected not just by increasing the minimum flow in the periphery region, but it would also be impacted

by how the peak flow will be affected by this. That is why I am asking for how the peak to average changes and how the minimum to average changes.

MR. CUMMINS: Yes. This is Ed Cummins.

We challenged the designers to use their CFX and to develop a design that met the fuels criteria, which I think Dale said was, you know, 85 percent minimum of average, and I don't know, 110 or 115 percent maximum. Then adjacent fuel elements have some criteria also, which is smaller than 15 percent.

So they created various different designs, and then let the CFX pick the one, and, ultimately, we are doing a seven-scale test in Japan, starting soon. That is going to measure the flow because there's all this concern over whether CFX really works.

MEMBER BANERJEE: Where in Japan are you doing it?

MR. WISEMAN: This is Dale Wiseman again. The test is being run in Yokohama.

MEMBER BANERJEE: At Toshiba?

MR. WISEMAN: At Toshiba, yes.

And the question about high flows

certainly applies. Our CFX results, our initial CFX results that led us to a flow skirt, it was the low flows that were driving us. But you're right, the high flows certainly do apply.

MR. SISK: I would like to make just one point of clarification, so that the record is correct. The tungsten was introduced in Rev 16 for the flywheel.

CHAIR RAY: Yes, I just was reading it here.

MR. SISK: I just didn't want that to go --

CHAIR RAY: So if we are comparing 15 to 17, you are comparing depleted uranium to --

MR. SISK: That is correct.

CHAIR RAY: -- what is proposed here now.

MR. WISEMAN: This is Dale Wiseman.

Let me clarify then. Those inertia numbers are for 16 to 17. They are tungsten. They are all tungsten numbers.

CHAIR RAY: Yes.

MR. WISEMAN: And the only difference is the retaining ring material.

MEMBER ABDEL-KHALIK: With the difference

in inertia between 15 and 17?

MR. WISEMAN: I am going to look before I say anything now.

(Laughter.)

CHAIR RAY: You can find the discussion on page 518 of the SER, but, basically, it says that the uranium wasn't able to meet the required angular inertia without getting too big and exceeding its stress limits.

MR. WISEMAN: Right. At some point when we got all the losses added up, the uranium flywheel was getting to the point where it wasn't feasible to show the stress --

CHAIR RAY: Right. That is what is described here. Okay.

MR. DEBLASIO: Okay. The other change was reactor vessel head penetrations. We had a reduction in the number of head penetrations for in-core instrumentation. We went from 42 one-inch penetration to eight penetrations, 4.75-inch diameter. This was all part of the integrated head package.

As a result, it gave us the ability to leave the instrumentation under water in the

refueling canal, which resulted in reductions in outage for ALARA concerns.

MEMBER BANERJEE: You are going to talk about any of the other items as well?

MR. DEBLASIO: Yes, sir. The one you mentioned was the injection of zinc. We proposed changes to incorporate the ability to inject zinc into the RCS. Zinc in a cooling system has been shown to change the oxide film on primary compounds, reducing occupational hazard exposure and the potential for crud formation, crud deposition on the fuel rods and subsequent power shifts.

MEMBER BANERJEE: Is there any cobalt in the system?

CONSULTANT KRESS: That is why they use these.

MEMBER BANERJEE: That is mainly what it does, yes.

CONSULTANT KRESS: Yes, right, it protects against these.

MEMBER BANERJEE: So do you have cobalt?

MR. WISEMAN: Yes. This is Dale Wiseman.

Yes, there will be some cobalt in the system, yes. We minimize it, but there is still

some.

CONSULTANT KRESS: Okay. This keeps the cobalt from getting activated and getting into the water?

MEMBER BANERJEE: Yes. Well, it sort of replaces the zinc.

But why did you change the injection capability? What was the reason for doing it --

MR. DEBLASIO: Dale?

MEMBER BANERJEE: -- from what you had before? Was there some evidence that you needed something different?

MR. CUMMINS: This is Ed Cummins.

I think EPRI is in the process of suggesting this is best practice for PWRs. It is particularly of concern to the Fuel Division, the fuel peak designers. When you have a relatively high-density core, zinc has been shown to reduce this offset anomaly, or whatever they call it now, but a power distribution in the core.

So I think it is best practice and it is good for ALARA.

MEMBER BANERJEE: But, usually, to reduce the radionuclide migration, so that you get less

occupational doses.

MR. CUMMINS: Right, but it also affects the crud on the core.

MEMBER BANERJEE: Of course, that's how it does it, yes. That is the procedure.

But I'm just wondering what you mean by change. You already had zinc injection capability in the old design, did you not?

MR. CUMMINS: Well, what we ended up using, a line that was used for hydrogen addition that came into the auxiliary building, and then you put, I will say, a skid of a pump and a tank and meters that wasn't in the design there. And you could pump zinc in using the hydrogen addition system. It is part of, we call it, CVS, which is chemical volume control.

MEMBER BANERJEE: That was in what, Rev 15?

MR. DEBLASIO: Rev 15.

MR. CUMMINS: Well, I don't think so. I think this came after that.

MEMBER BANERJEE: So it is additional. It is not a change. It is addition?

MR. SISK: Yes, it is an addition.

MR. CUMMINS: Yes.

MR. SISK: Zinc addition is being added to --

MR. CUMMINS: We didn't have it in the Certified Design, though I don't actually remember where the Revs are.

MR. SISK: It is Rev 16, but what they were doing is, in Rev 15 we did not have the zinc addition in there, but it was determined, based really on operating experience, that zinc addition has a tremendous benefit, but doing it from day one, instead of adding it in later.

MEMBER BANERJEE: Well, Langstock has been doing this for 15 years now, but that is, of course, a BWR.

MR. SISK: But this was perceived to be an added value, best practice. It is better to do it now than to bring it back in later, as a lot of plants have done.

MEMBER ABDEL-KHALIK: As far as the axial offset anomaly, would this be considered a high-duty index core?

MR. SISK: I think it could be considered a high-duty core, but I don't think axial offset. We

will talk about it a little bit in Chapter 4. We will have our field design folks here.

But, with the implementation of graded rods, which were approved in Revision 15, the actual offset anomalies and deviation, we don't see that with the graded rods because you really do a flat and then you are maintaining the power distribution throughout the core.

MEMBER ABDEL-KHALIK: But, nevertheless, it is still dictated by peak heat flux locations --

MR. SISK: Right.

MEMBER ABDEL-KHALIK: -- and power distribution.

MR. SISK: I'm going to reserve the full answer to that when our core designer gets here and gives you a better answer.

MEMBER ABDEL-KHALIK: Okay. Back to the first issue which we discussed earlier about the relocation of instrumentation, relocating the narrow-range RTD upstream of the pressurizer surge line, does that have any impact on the dead band for rod control?

MR. DEBLASIO: I don't know the answer. I don't think so, but we could get a definitive

answer for you.

CHAIR RAY: So long as we are on that point, it may be pretty picky, but I also would like to know, does it matter for this void detection purpose whether the RTD is in the top or just in the upper half? Because it is described both ways.

MR. WISEMAN: This is Dale Wiseman.

We ended up, actually, in Rev 17 with a note on the PNID that it should be in the upper half.

CHAIR RAY: Yes, I see that. Elsewhere it is described as having to be at the top, and I don't want to belabor it, but it seems like an inconsistency that I was curious about. Let's not dwell on it now.

MR. WISEMAN: Well, I believe that the upper half is sufficient. I don't think it has to be on the top, but we will confirm that.

MR. SISK: We typically like to give ourselves a little bit of wiggle room, only in the sense that the top and then you go out.

CHAIR RAY: Well, I understand, but it sort of stands out, and it is described both ways --

MR. SISK: We should be consistent.

CHAIR RAY: -- to be at the top, and

another place says now we're satisfied if it is in the upper half. If you are trying to detect a void, it may make a difference where it is located.

Okay, anything more on any of this?

CONSULTANT KRESS: Is there any data on how much zinc actually gets coated on the fuel rods during their lifetime?

MR. CUMMINS: Ed Cummins.

Yes, I don't know all this. I know Vogtle is using zinc addition. EPRI had a big program. Westinghouse and EPRI worked together. I think that they did fuel tests for several years and determined that the zinc had a positive effect on fuel corrosion and fuel performance.

MR. SISK: And an insignificant effect in terms of any heat transfer impact.

CONSULTANT KRESS: Yes, I was concerned a little bit about any steam zinc reaction in severe accidents. Steam zinc reaction would liberate more heat, and I don't know if that has been factored into the core melt progression for severe accidents or not. It may not be enough zinc on there to make any difference. That is why I was asking how much.

MR. SISK: I don't have an answer today

off the top to give you a definitive number. I can only reiterate, I think, that zinc addition --

CONSULTANT KRESS: This would be a PRA issue and severe accident issue.

MR. SISK: And zinc addition has been looked at and been incorporated in the fleet. It is not a new idea or a new incorporation for AP1000, but the operating plants have been incorporating it and it has been looked at in some depth.

MEMBER ABDEL-KHALIK: But it would be a good idea to follow up on this question.

MR. SISK: Oh, I wrote it down, yes, sir.

MEMBER ABDEL-KHALIK: Thank you.

MEMBER BANERJEE: It is really a question of, if your fuel looks very much like you are operating pumps, that is, of course, there is a lot of experience now with it. But if you are changing -- your core is the same height, isn't it, or is it -- yes, it is a longer core. That is really what I was asking. I mean, is there an experience base with zinc in these like with longer cores?

MR. SISK: The person that would know that answer will be here tomorrow, but I don't know the answer for sure. We do have plants with the

longer core. The only thing I am trying to remember is whether they had incorporated zinc addition at some point in the plant life, and I just don't remember off the top of my head.

CHAIR RAY: Back to these reactor coolant pump flywheels are of concern to me or interest, we had better say. They can never be inspected. So we are relying entirely on the missile penetration analysis.

It is not clear -- and I will comment to the staff later, but there is a discussion that makes it appear as if it is not possible for flywheel missiles to penetrate something that is called the pump casing. Can any of you folks tell me what is meant by that? Or are we talking about the can that surrounds the flywheel already?

MR. WISEMAN: This is Dale Wiseman.

The flywheel missile analysis basically shows that, if the flywheel would fail and impact the pressure boundary of the pump, it would not penetrate the pressure boundary of the pump.

CHAIR RAY: Really? The can?

MR. WISEMAN: No, the can is not the pressure boundary.

CHAIR RAY: All right, that is what I am trying to understand.

MR. WISEMAN: Right. The pressure boundary is the big flange and forgings that enclose the motor and the hydraulics.

CHAIR RAY: Okay.

MR. WISEMAN: So it is substantial.

CHAIR RAY: Well, we will need to see a picture to understand what we are talking about here, but that is an item, certainly, of interest.

MEMBER BROWN: Can I ask a question relative to that? Is the flywheel inside the can? I mean I would imagine it would have to be.

MR. WISEMAN: It is inside the pressure boundary.

MEMBER BROWN: Oh, okay.

MR. WISEMAN: But it is not inside -- these are can motor pumps. The cans are the thin cans that are around the stator and the rotor. So it keeps the stator dry. But they are not pressure bound.

MEMBER BROWN: But if that came apart, you would puncture the pressure boundary in this circumstance?

MR. WISEMAN: You would not puncture the pressure boundary. That is what our analysis --

MEMBER BROWN: So that little, thin can is strong enough?

CONSULTANT KRESS: It is all inside the pressure boundary.

MR. WISEMAN: The thin can is not the pressure boundary.

CONSULTANT KRESS: It's inside.

MR. WISEMAN: Yes, the thin can is inside the pressure boundary. The thin can keeps the reactor coolant from the stator and rotor, but it is not the pressure boundary structure.

CHAIR RAY: Okay. Well, we need a picture because some of us have -- can motor pumps and --

MEMBER BROWN: Yes, my brain is back into another thought process.

MR. CUMMINS: This is Ed Cummins.

I mean there is an ASME pressure boundary that is designed for reactor coolant pressure. There's also this can, which is a pressure -- I will call it a pressure boundary, but it relies on, it backs up against the bars, so it doesn't really take

all the pressure.

MEMBER BROWN: Against the what?

MR. CUMMINS: The conductor bars.

MEMBER BROWN: Oh, okay.

MR. CUMMINS: So it really doesn't take all the pressure, but it keeps the electrical windings dry. Failure of that means you failed the pump, but you didn't get any leak; you didn't get any LOCA.

MEMBER BROWN: I understand.

CONSULTANT KRESS: By asserting that the missile doesn't penetrate the pressure boundary obviates the need to do a probabilistic missile analysis? It doesn't go through all the probability of a frequency failure.

MR. CUMMINS: Right.

CHAIR RAY: Okay, I get a better picture now then.

MR. SISK: Do you have a picture we can put up? Do you want to talk to it?

CHAIR RAY: Well, given the hour, well, it is actually in this chapter, isn't it?

MR. SISK: Yes.

CHAIR RAY: If it is handy and you can do

it in two minutes, I think it would help all of us to understand better.

Because I was confused by the topic we have just been discussing, which is -- it's a can motor pump that flywheel missiles won't penetrate the pressure boundary.

MR. SISK: We have to have the guy hook up that computer to the --

CHAIR RAY: It's all right. Never mind. We will look to some later time to --

MR. SISK: I would be glad to show it at the break. I will bring it around.

CHAIR RAY: -- examine this. Well, I'm more concerned that all of the Subcommittee members, and perhaps the Committee members as well, look at it.

But it is an important thing because, as I say, there is no way to conduct ISI of this flywheel, and it is sitting there forever operating at high speed. So we need to be absolutely positively sure that there's no threat to the pressure boundary from the flywheel, and that is not clear enough without seeing a picture.

MEMBER BROWN: Is this the same pump that

is going to be used in the Chinese application?

MR. WISEMAN: This is Dale Wiseman.

Yes, this is the standard licensed pump for AP1000, China and U.S.

CHAIR RAY: It was interesting in the discussion -- again, I am referring not to what the applicant has said, but what the staff has said -- that there was some back and forth on changing the terminology to allow a generic reference to the can motor pump, as if maybe there would be more than one vendor, but that got resolved finally.

MR. CUMMINS: Yes. This is Ed Cummins.

The staff convinced us that it was too hard to keep options open for something as important as that.

CHAIR RAY: Okay. All right, fine. Let's go ahead. Where are we?

MR. DEBLASIO: Well, the last bullet on that page was the normal residual heat removal, low-temperature relief valve. It says "increase"; it really was decreased, the valve size, because we had some detailed discussions with the valve vendor and described the conditions that those valves would be under, and the vendor recommended using a smaller

valve to avoid valve chatter.

MEMBER BROWN: I would ask one question relative to the pump for the Chinese applications. I read somewhere that there was some technology transfer associated with building these plants. So you say there's not going to be anybody else building this, but I would imagine -- and if this is out of bounds, just tell me, but I've forgotten where I read it, but the Chinese are buying all this technology after some number of whatever. So somebody else will be making these pumps, is that correct or not?

MR. CUMMINS: Yes. Ed Cummins.

Yes, there is a technology transfer; the actual technology transfer from the pump is from Curtis Wright directly to the Chinese. I know they have consulted with their other customers and they're okay with this. I think there's a long-term goal of the Chinese to build the can motor pumps in China in their own industry.

MEMBER BROWN: Okay.

MR. CUMMINS: And that is something that is not going to occur in our first four plants. We are supplying all of the pumps for the first four plants.

CHAIR RAY: Okay. I see a cross-section of a motor up there. Is this something we can do in a relatively brief period of time or am I taking us down a bunny trail here? Give it a try.

MR. SISK: Dale, do you want to talk through it? Do you want me to just point to it?

CHAIR RAY: The problem will be that the microphones don't pick up generally when somebody is standing at the screen. So, if you can stand and look toward us and just wave your arms toward the screen, it will help.

MR. WISEMAN: Okay. This is Dale Wiseman.

There are actually two flywheels in the pump, one up just below the impeller and diffuser and hydraulics and one down below. The only reason there's two there is it is a rotor dynamics issue, a balance in the rotor dynamics.

But the pressure boundary, when we talk about not penetrating the pressure boundary, we are talking about not penetrating, as Ed said, the ASME pressure boundary, which is this big flange here with the casing, and the stator closure flange in here.

The black area here are the tungsten

inserts, and then the small ring just outside of it is the retainer ring that holds the tungsten inserts onto the shaft.

So, up here, these two big flanges are the pressure boundary flanges that we are looking at, and down at the lower flywheel it is this stator closure that is the ASME pressure valve.

The cans, when you are talking can motor space, and if we had a better picture here, you could see that the cans are inside this blank space here, and the stator windings are in here.

CHAIR RAY: All right. I think, conceptually, we have the idea. There's actually two barriers. One is the can that keeps the stator dry, and the other is the pressure boundary, in the event, which I guess isn't exposed to RCS pressure normally, is that right, because the can would prevent that?

MR. CUMMINS: Ed Cummins.

No, there is water that is cooling the pump that is always at RCS pressure.

CHAIR RAY: Oh, I see. All right. Okay, sure.

MR. CUMMINS: There are little kind of thermal barriers that try to restrict the flow in

there, but it is always at RCS pressure. That is true for the other people's pump, too.

CHAIR RAY: Okay. Well, this probably isn't a good time to go into any further depth. Thank you.

CONSULTANT KRESS: Those tungsten pieces, they are not full cylindrical all the way around? They are little partial --

MR. WISEMAN: They are pie-shaped.

CONSULTANT KRESS: Pie-shaped.

MR. WISEMAN: There's, I believe, maybe a dozen pie-shaped tungsten inserts that fit around, and then they are all held in place by the retaining ring that is shrunk onto them.

CHAIR RAY: Okay.

CONSULTANT KRESS: That makes the missile analysis easier.

CHAIR RAY: Rob, are you in charge here?

MR. SISK: Okay. Yes, sir.

(Laughter.)

I think you are, sir.

CHAIR RAY: Well, let's get some order out of the chaos I created, and tell me what more we need to cover.

MR. SISK: If members are satisfied with the discussion by Westinghouse, we would turn it to the COL applicants now and allow them to talk about Chapter 5 from a COL perspective.

CHAIR RAY: Ed, how long are you going to need?

MR. GRANT: It depends on how many questions you have, but I will try to run through it in 10 minutes.

CHAIR RAY: That will be fine.

MR. GRANT: All right.

The same basic summary for Chapter 5 in content, system summary descriptions, and those types of things.

COL items, the things that need to be covered, the ASME code and addenda, because they've got a design, but time goes on, marches on. So we will have to identify the ASME code and addenda that we are going to use. That is actually my rule, the one that is 12 months prior to the time that we begin to operate, or not operate, but the time that we --

CHAIR RAY: Field?

MR. GRANT: Yes. Anyway, down the road some.

What we will do is, once we are absolutely certain what that ASME code and addenda is, then we will do a code reconciliation as necessary to match up with the design code and addenda.

CHAIR RAY: What is the milestone though? It's not field load, is it?

MR. GRANT: No, it's not. Hang on. It depends on the --

CHAIR RAY: What's the event that triggers --

MR. GRANT: I don't have that in front of me, but I will look that up.

CHAIR RAY: Stephanie?

MS. COFFIN: I can go on and I can see if I can --

CHAIR RAY: All right, after lunch.

Go ahead.

MR. GRANT: All right. The second item was plant-specific inspection program. Again, this was something that is programmatic and, therefore, the DCD didn't cover it, so we provided, again, just a full description of our inspection program.

Vessel pressure and temperature limit

curves. The staff, or not the staff, but the Westinghouse folks have provided some generic curves. But this is an item that is dependent on the as-built reactor vessel. The materials may vary slightly. Once we have the as-build reactor vessel materials, then we will get the final pressure temperature limit curves.

So that is a post-COL item, post issuance of the operating license. So we have proposed the license condition for that.

CONSULTANT KRESS: Who is making your vessel?

MR. GRANT: We would have to ask Westinghouse.

CONSULTANT KRESS: Are the Italians making that?

MR. SISK: Korea.

CONSULTANT KRESS: Korea?

MR. GRANT: There aren't many places to get one these days.

CONSULTANT KRESS: Two or three places?

MR. GRANT: Yes.

Reactor vessel materials surveillance program, again, that was applicant-specific. We have

provided some information there to supplement the portion of the program that the Westinghouse folks had already provided. Most of that was how we were going to put the program together, where we were going to get the samples directly from the reactor vessel, and how we would then pull those out.

CHAIR RAY: There is leak-before-break materials criteria that you have to comply with. I'm not trying to re-raise that issue. That is an existing requirement, right?

MR. GRANT: There are leak-before-break. I'm not sure that is directly applicable to the reactor vessel.

CHAIR RAY: No, it's not. I'm talking about -- oh, yes, I'm sorry, it does say reactor vessel.

MR. GRANT: Yes.

CHAIR RAY: I was focusing on the materials here, and I didn't notice that.

MR. GRANT: I know. No problem.

CHAIR RAY: Piping material.

MR. GRANT: Yes. Definitely on the piping material. But I believe all of that has been addressed in the DCD, Chapter 3.

CHAIR RAY: So I say it is a settled issue. I was just trying to confirm it in my mind.

MR. GRANT: All right. Standard item 53-4, very similar to one of the previous ones, reactor vessel materials properties verification. It has to do with, again, as-built reactor vessel and materials, just as we have to verify those materials, and as I indicated in a previous one, that would feed then into the pressure temperature limits.

Both of those, again, must be performed after the vessel is built or as the materials are identified to build the vessel. So that would be later.

CONSULTANT KRESS: I'm sorry. How do you verify the weld materials? That is generally important for pressured thermal shock. Do you have a vessel that's -- you can get the material samples there, right?

MR. GRANT: Right, exactly. As the material is built or as the vessel is built, and as they use the rods to do the welding, they will take sample rod --

CONSULTANT KRESS: Yes. Okay.

MR. GRANT: The last item was a steam

generator tube integrity program, and that is a pretty standard program these days. It is a template that has been accepted, NEI 07-06. We will use those guidelines, and also, that refers to some EPRI steam generator management guidelines. So we will adopt those, and we describe the program through adoption of those pretty standard programs.

Next slide.

The other information that is provided, a couple of sets of standard supplemental information, reactor coolant chemistry program. Again, this is something back to expected information within the COL application. So we describe that chemistry program and where we would go with that.

Pressure temperature control procedures, again, pressure temperature limits. We have to be able to do that, and we describe the set of procedures that we would follow during operation of the plant.

There are no open items for Chapter 5. So we are pretty straightforward there.

CONSULTANT KRESS: Back to your steam generator.

MR. GRANT: Uh-hum.

CONSULTANT KRESS: As I recall, isn't that a new design?

MR. GRANT: Design, I will turn to Westinghouse.

CONSULTANT KRESS: It is not the same steam generators you are using in the other PWRs, is it?

MR. SISK: I will let Dale discuss the design here.

MR. WISEMAN: This is Dale Wiseman.

The AP1000 generator is bigger than our standard plant design, our current plant designs, for the most part. But it does approach the size of some of the CE unit generators.

So it is a new design, using features that have been proven in our current plans, but the overall -- this is a new design, putting those all together, yes.

MR. SISK: Well, it is not a change in the design, though. It has been reviewed.

CONSULTANT KRESS: For the AP1000.

MR. SISK: Right.

MEMBER ABDEL-KHALIK: Now this item 5.3, the pressure temperature control procedures, this is

just the procedures, not the setpoint study involved?

MR. GRANT: I'm sorry, I missed that. I was still concentrating on --

MEMBER ABDEL-KHALIK: You were talking earlier about change in the pressurizer aspect ratio and how that may impact the setpoints.

MR. GRANT: Yes, sir.

MEMBER ABDEL-KHALIK: So how was that taken into account in your R-COLA specification of these pressure temperature control procedures?

MR. CUMMINS: This is Ed Cummins.

The setpoints are Westinghouse design responsibility.

MEMBER ABDEL-KHALIK: All right.

MR. CUMMINS: Yes, and I believe that what he is talking about here in the COL item is a program, so a program that monitors or that maintains. So the difference between the two things is that Westinghouse does the error analysis and makes the setpoints, and then the power companies incorporate them in procedures and monitor them and do things that are process-oriented. So the COL item is process-oriented, not design-oriented.

MEMBER ABDEL-KHALIK: So where are the

changes in the results of the setpoints study that are caused by design modifications described?

MR. CUMMINS: Yes, maybe they are not, but we will take that as an open item. It is a Westinghouse design question. So we will take that as a question.

CHAIR RAY: Okay, anything else, Chapter 5?

MR. GRANT: The only thing I would add here is this is one of those places where we do have a couple of confirmatory items that don't fit the mold, where we have told them we are going to put this information in the FSAR and they said, yes, when you do that, everything will be fine.

We have a couple of items there where the staff has basically told us what they need. We understand what they need, and we just need to send them a letter that says, yes, we will put statements to that effect into the FSAR. So we will be doing that very soon.

One of those has to do with a recent rule change. We had originally committed to meet a code, as identified in a proposed rule change, and that is what our FSAR says. The confirmatory item is for us

to change that reference to the final rule, which we certainly understand and we will do that. So that is a simple, straightforward item, but it doesn't meet the mold of the others that we talked about.

The final one is reference to the reactor vessel surveillance program, the materials surveillance program that we talked about. The staff has asked for us to confirm that the surveillance capsules are backfilled with inert gas. That is a standard thing that goes with the associated code that goes with that ASTME-185. So we understand what they need. We just need to put a statement in that says we meet that part of the code, and we are certainly willing to do that. So we will be getting that to them, again, fairly soon.

Again, just because it is different, that it doesn't meet the same format of where we already told them what we are going to put in, and they have agreed that that is the right stuff. It is kind of the other way around this time; they told us what to put in.

CHAIR RAY: All right. Thank you.

Okay. We were to break for lunch at 12:10. It is now 12:20. We will take an hour lunch,

but I want to advise everybody that we will go through the full agenda, even if it runs late today, because we need to go through these items as we have been doing. I think that may affect some who were hoping to get out early today, but we won't be able to do that, in all likelihood.

So we will resume at 1:20 with a staff discussion of Chapter 5.

(Whereupon, the foregoing matter went off the record at 12:22 p.m. for lunch and went back on the record at 1:22 p.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:22 p.m.

CHAIR RAY: We will come back to order, please.

We will complete now Chapter 5 with a presentation by the staff.

I will note we will take a coffee break this afternoon, even though we are running late, since some of us are in a different time zone and have to compensate for that, and other reasons.

So, with that, yes, Eddie, you want to say something?

MR. GRANT: Could I have 30 seconds to address --

CHAIR RAY: Not more than that, yes.

(Laughter.)

MR. GRANT: -- a question from before?

You asked a question about our first COL item or code identification and a milestone that it was dependent on.

CHAIR RAY: Right.

MR. GRANT: It is actually not dependent on a milestone. It is already identified in the DCD. It depends more on the contract, when the contract

is signed, and when you order the equipment, the vendor will provide whatever he is building it to, and we will do our code reconciliation against the DCD at that point.

Now there is a milestone associated with the in-service inspection and in-service test program. That code addenda is 12 months prior to fuel load.

CHAIR RAY: Right. All right, so the world hasn't changed that much then.

MR. GRANT: Right.

CHAIR RAY: Okay. Perry, are you up?

MR. BUCKBERG: Good to go.

CHAIR RAY: Go.

MR. BUCKBERG: Good afternoon. My name is Perry Buckberg. I'm a Senior Project Manager on the AP1000 Projects Branch on the DCD side, working for Eileen. I'm going to kick off the Chapter 5 presentation of the AP1000 Design Certification Amendment review on the staff side.

Joining me and Ravi Joshi, who is going to take over for the staff's Bellefonte COL portion; our primary technical staff members, Dave Terao and Gene Hsii, over on the side. There are many other

staff members who contributed.

Chapter 5 of the SER reflects the evaluation of DCD Revision 16 changes and some of the Revision 17 changes. It is a bit of a mix.

Review of the four Chapter 5 sections resulted in two DCA open items in each of Sections 5.2 and 5.4, and those the COL open items.

CHAIR RAY: I don't think there is any reason for the ACRS to take note of 16 versus 15. That probably is important to you all, but we are only interested, I think, in 15 to 17.

MR. BUCKBERG: Which that will be the end of the story after the final SER, but we are tracking it. So it is important to us.

CHAIR RAY: Okay.

MR. BUCKBERG: Next slide.

Changes the staff considers significant are listed by section in this slide. There are many other changes as well, though. The highlighted changes are a subset that will be presented by the technical staff in the following slides.

The staff is prepared to address any questions on any other changes evaluated in the SER. I don't think the members need to know, to tell you

that.

With no further ado, I will pass it on to Dave Terao.

MR. TERAO: Okay, thank you, Perry.

Good afternoon. I'm David Terao. I'm Chief of the Component Integrity Branch in the Division of Engineering.

There's a lot of issues to cover today in both the AP1000 Design Certification Amendment and Bellefonte's COL application. So what we are prepared to discuss are the issues that we think would be of interest to you. They are not necessarily the open items. In fact, some of the open items, I would say, are really non-issues. Well, some of the other issues I think are worth discussing because with the Design Certification Amendment and COL, there's some new issues that have come up.

I do want to say that I have several subject matter experts in the audience. So, if I need support, I will call on them for any technical assistance.

I also wanted to mention that, with Rev 17, since it came in late last year, our Branch has

not completed all of its review of some of the Rev 17 changes, especially some of those that were unsolicited. So we are still having discussions with Westinghouse and still reviewing some of those Rev 17 changes. I didn't want to give you an impression that we are completely finished with the Rev 17 review, and some of those issues will come up, as you will see.

So let's go to the first issue, which is on the applicable code cases. This is one of those open items that I will just run through very quickly. It is not that important, but I wanted to raise this because the AP1000 DCD has a table, 5.2-3, that lists the ASME code cases that's used for the AP1000 design.

As you are well aware, code cases are ASME-approved alternatives to the ASME code requirements, and the NRC staff then approves those code cases in Reg Guides 1.84, 1.147, and 1.192, specifically for Section 3, Section 11, and the Operation and Maintenance code cases, respectively.

The AP1000 table lists primarily the ASME Section 3 code cases, but there are some Section 2 materials code cases and some Section 9 welding code

cases listed there as well. And also, because the AP1000 DCD addresses in part, and maybe more than just part, some of the ISI and IST programs, which are Section 11 and OM, the staff asks Westinghouse, are there any design-related code cases related to ISI or IST, in-service inspection or in-service testing, that need to be included as part of the Certified Design?

We've gotten some responses from Westinghouse. I think this issue has been resolved with the latest response, and I think the answer was there weren't any.

CHAIR RAY: Well, does the flywheel, for example, represent an exception to the normal requirements for in-service inspection?

MR. TERAO: It's not part of the Section 11 ISI.

CHAIR RAY: Yes, it is not a pressure boundary part, I know, but okay.

MR. TERAO: But we will get to the flywheel later.

CHAIR RAY: All right.

MR. TERAO: All right. So this issue is pretty much resolved. Westinghouse will be revising

its DCD to specifically address whether or not they are using any Section 11 or OM code cases.

Next slide.

On this slide, in the Design Certification Amendment, Westinghouse changed some of its materials and properties of the reactor coolant pressure boundary materials that was specified in the Certified Design. For example, we have a few examples up there.

Westinghouse added some more commonly-available stainless steel materials, Types 304 and 304L, for example, to supplement the low-carbon, nickel-based stainless steel materials, the Type 304LN and 316LN.

Based on operating experience, the staff found these materials, the more commonly-available stainless steel materials, to have good resistance to stress corrosion and cracking in PWR environments and are compatible with reactor coolant water chemistry.

Some of the other changes that were made is Westinghouse raised the copper limit from .03 percent to .06 percent. As Westinghouse discussed, this was to allow, in part, flexibility and potential forging suppliers.

The staff found that this higher copper limit does not have a significant impact on pressurized thermal shock and is within the screening criteria of 10 CFR 50.61.

There were some changes to the delta ferrite upper limit. It was increased to 20 FN ferrite number. But, essentially, what the staff found is that the changes to the materials met the ASME code Section 3 and at this time there are no open items that have been identified.

I do want to point out that one of the changes that Westinghouse added in Rev 17 is they did propose some new carbon steel-based materials for reactor coolant pressure boundary components, such as the pressure forgings, including nozzles and 2Gs for the steam generators. So the staff is still pursuing some questions on how they can incorporate the effect of using carbon steel-based materials in reactor coolant pressure boundary. So it is not identified as an open item. We are still reviewing that.

CHAIR RAY: It is cladized, though?

MR. TERAO: Hopefully.

CHAIR RAY: Yes.

MEMBER BROWN: The new materials are

304 -- or the current materials are 304LN and 316LN?

MR. TERAO: The certified materials.

MEMBER BROWN: I'm reading your sentence. Those are the certified materials? But the 304, 304L, 316, and 316L are new?

MR. TERAO: Yes, as of Rev 15; Rev 16 was later, yes.

MEMBER BROWN: Okay. Is there other experience with these as stainless steel, as pressure boundary materials in other plants?

MR. TERAO: For Boiling Water Reactors, it is a concern with IGSCC, inter-granular stress corrosion cracking. But for PWRs, the staff has not found any significant degradations, just corrosion cracking, for this type of material in PWR environments.

MEMBER BROWN: Is it used in other PWR environments? Or is this just based on the test information?

MR. TERAO: No, no. Yes, it is used.

MEMBER BROWN: Okay, that was my question --

MR. TERAO: Yes, yes.

MEMBER BROWN: -- are they used in other

PWRs? So there is experience with the material as a pressure boundary in other PWR applications?

MR. TERAO: Yes.

MEMBER BROWN: It is just a change from the Rev 15?

MR. TERAO: Right.

MEMBER BROWN: Okay.

MR. TERAO: Again, to allow flexibility.

All right, the next slide deals with pressure and temperature limits.

Earlier Professor Abdel-Khalik asked the question about, how does the staff ensure that IBRed information is not impacted by standard COL information or site-specific information, and you asked for some examples, if we can come up with one on when it might not be appropriate to incorporate by reference some DCD information. Well, this is a good example. So I will get into this a little bit more detailed than I intended to try to explain this example to you.

In fact, your question is a very good question because the staff does more than just take it for granted that information that is IBRed is acceptable. In fact, that I would consider is one of

our more technical reviews, is to look at the compatibility of the information that is being IBRed and also the information that is put into a COL FSAR. We will talk about this item again in the Bellefonte portion.

But I will give you a little history on this item. In the DCD, originally, Westinghouse provided generic pressure temperature limit curves for the AP1000 reactor vessel based on limiting material properties, copper and nickel content, in order to meet the fracture toughness requirements of 10 CFR Appendix G.

I should point out that the P-T limits are required to be in tech specs, but at that time, when we looked at the AP1000 tech specs, the tech specs did not have the pressure temperature limit curves in there. Rather, the AP1000 DCD only referenced a PTLR, a pressure temperature limit report, but it didn't specify a specific document. It was just APTLR.

So the staff -- at that point, Westinghouse had two choices. They could either put the generic P-T limit curves into their tech specs or they could pursue developing a PTLR specifically

using those P-T limit curves.

So Westinghouse decided to develop a PTLR. And, oh, I would point out that if the P-T limit curves were put into the tech specs themselves, into the AP1000 DCD tech specs, then what would happen is that each COL applicant, as they built their vessel, would have to update those P-T limit curves specifically for their vessel, and then those P-T limit curves would then have to be reviewed by the staff. So it would entail quite a bit of work by both COL applicants as well as the NRC staff to review plant-specific P-T limit curves in each plant's tech specs.

So Westinghouse did decide to develop a PTLR, and by doing so for the AP1000, now they would have a generic pressure temperature limit report that COL applicants can now reference, and the P-T limits are no longer in the tech specs. In fact, it is controlled outside the tech specs, so that the COL applicants, the COL licensees at that point can change the P-T limit curves, as long as they meet the PTLR methodology for developing those curves and not have to submit it to the NRC staff for review and approval.

But what it required is for the staff to upfront review the PTLR methodology, the curves, and make sure that the PTLR met the NRC's guidance. So that is basically what happened, is that Westinghouse followed the guidelines of Generic Letter 96-03 in preparing the PTLR, and staff eventually approved the generic PTLR in a letter dated December 30th, 2008.

At this time, there is no issue there. But, going back to your question about whether or not a COL applicant, if he had just referenced the tech specs as written, and had we not looked in detail at those tech specs, we might have had a problem later on. So that is one example that I wanted to point out to you.

I would point out, also, that the PTLR was reviewed, I would say, outside of the Design Certification. In other words, we did it by letter, our approval letter. It was also by letter.

The item left, it is a confirmatory item, but the Westinghouse DCD still references a generic PTLR, and what Westinghouse is now going to do as a confirmatory item is specifically state which PTLR it is, perhaps reference the letter, but be more specific on what the PTLR is that COL applicants

should follow.

CHAIR RAY: Why wouldn't this have been a topical report? Or is it functionally the same as?

MR. TERAO: Well, it wasn't submitted as a topical report. I don't know. Maybe Neil Ray can help me.

Are PTLRs typically submitted as topical reports?

MR. NEIL RAY: This is Neil Ray.

Topical reports and technical reports, that is like they are different. When a subject is completely new to staff, then we basically treat it as a topical report because we have to do a lot of research, and so on and so forth. In this case, it is not. So we treat it as a technical report.

As Dave pointed out, PTLR is a quite detailed and almost once-in-a-lifetime kind of a report for a plant. So there are seven criteria, and we have to look at each and every criteria, so that the staff has to be satisfied with each and every criteria before we approve it.

So, to answer your question, this was submitted as a technical report outside the CD, and we reviewed and approved it.

MR. TERAO: And the only thing left is that I would point out that a COL applicant still has the option, I mean it could still put P-T limit curves in its tech specs if it wanted to. So there is a COL information item for COL applicants to address how they are going to use their PTLRs, and we will talk about that when we get to Bellefonte specifically.

Next item, reactor coolant pump flywheel that we had quite a bit of discussion on this morning. The major change was to the reactor coolant pump from Rev 15 to Rev 16. At that time, the reactor coolant pump was changed from a very specific design, using depleted uranium, to a more generic reactor coolant pump design, using the tungsten inserts.

The staff pursued some questions with Westinghouse about the use of a generic pump. As Ed Cummins mentioned, they are now specifying a more specific reactor coolant pump, canned pump.

The change from the depleted uranium to metal tungsten resulted in the need to revise the AP1000 flywheel analysis. Then that was done. The staff did review that revised flywheel analysis and

found the changes acceptable on the basis that the revised flywheel analysis demonstrated that, in postulating a flywheel failure, pieces of the flywheel will not penetrate the reactor coolant pump casing.

Also, the staff found that the revised materials were compatible with the PWR reactor coolant chemistry.

At that point, the staff still identified a need for Westinghouse to include in its DCD the new flywheel material, the tungsten inserts. Since they made the change, they deleted the old material, but didn't replace it with a new material. So that what is being tracked as an open item.

CHAIR RAY: David, could you reconcile what you just said with what I thought we heard from the applicants, that they have not yet submitted the missile analysis?

MR. TERAO: Yes, and I'm getting to that, but what has happened since then -- in fact, this is probably in the last month or so -- Westinghouse has again proposed to revise the material used in the flywheel outer hub. I think, what was the --

CHAIR RAY: Okay. All right, 16 to 17,

in other words.

MR. TERAO: Right. The retaining ring, as Westinghouse called it.

So we were still reviewing the impact of that change to flywheel analysis as we came to ACRS, but now we heard that, yes, indeed, Westinghouse is revising its flywheel analysis with this new material for the outer hub, but we have not seen it yet.

So we kind of jumped around. It is what you knew at what time.

CHAIR RAY: Okay.

MR. TERAO: I was trying to just put it in perspective.

CHAIR RAY: That's fine.

MR. TERAO: All right.

MEMBER ABDEL-KHALIK: But in going from 15 to 16 to 17, the inertia of the flywheel has increased significantly, at least in going from depleted uranium to tungsten. Do you know how much of a change in the minimum DMVR that resulted in for the total loss of flow?

MR. TERAO: I would not know. Probably that would be reactor systems, but --

MEMBER ABDEL-KHALIK: I mean that is in

the conservative direction, I understand, but I just want to get a feel for how much of a change that was.

MR. SISK: We will have those values available today.

CONSULTANT KRESS: Would that be part of Chapter 15 --

CHAIR RAY: I thought they said the inertia went down?

CONSULTANT KRESS: Would that be part of Chapter 15, Said?

CHAIR RAY: You are relating 16 to 17 from 15 to 17.

MS. McKENNA: Why don't we get back to you on that rather than trying to answer that on the fly?

MEMBER ABDEL-KHALIK: Thank you.

MR. TERAO: Okay. All right, next slide.

I will let Gene Hsii talk about the reactor coolant external heat exchanger design.

MR. HSII: My name is Gene Hsii.

CHAIR RAY: You had better hold on. Can we move the microphone over?

MR. HSII: In the DCD, the reactor coolant pump motor's cooling was achieved by means of

an internal heating coil near the thermal barrier, and the heat exchanger around the outside of the motor stator.

In Revision 17, they made a design change. They removed the internal cooling coil and using a conventional heat exchanger. The heat exchangers also have the pump. It is not only the pump frange.

There is a stick of cable on the bottom of the pump shock, and that provides force, circulating the primary force through the motor cavity and through the side of the heat exchanger, and comes back. In the other side of the heat exchanger was provided by the component cooling water to provide a heat sink.

The removal of internal cooling coil in the pump design and also use this external heat exchanger provided capability to easily design the heat exchanger to meet the cooling requirement.

Since this is outside of the pump, so the external piping and the cubes inside the heat exchanger, they are the reactor cooling pressure boundary. So they must meet the requirement of ASME code 16.3, Class A, requirement.

Westinghouse has developed a generic heat exchanger design specification that identified the thermal and mechanical design bases and requirement. That serves as the basis for the final design of the heat exchanger.

The staff had looked at that -- they have not submitted, but we did a quick look at the report, and we have not identified any technical issue.

But since Westinghouse has not submitted the report on the target, all reference in the DCD, so we make it an open item. But, basically, we have not identified any technical issue here.

CONSULTANT KRESS: What is the source of cooling in the heat exchanger itself? Is that external water?

MR. HSII: Component cooling water.

CONSULTANT KRESS: Component cooling water?

MR. HSII: Yes.

CONSULTANT KRESS: Does that penetrate the containment?

MR. HSII: Yes. Component cooling water, the system is outside and penetrates the containment --

CONSULTANT KRESS: The heat exchanger itself is inside the containment?

MR. HSII: Oh, yes.

CONSULTANT KRESS: And there is a pump associated with it?

MR. HSII: The heat exchanger is on top of the pump flange.

CONSULTANT KRESS: Oh, yes.

MR. HSII: Yes.

MEMBER BROWN: You said something about its being pumped?

MR. HSII: Yes.

MEMBER BROWN: I thought I heard you say there was a pump included. Is that wrong?

MR. HSII: There is a heat impellor on the bottom of the construct inside the pump. So that provides circulation force.

MEMBER BROWN: All right.

MR. HSII: Okay, a negative --

MEMBER BROWN: Inside the pressure boundary?

CHAIR RAY: Yes, I mean one issue in my mind at the moment would be whether this missile analysis can in any way threaten the practical and

pressure boundary coils he was just referring to that are part of this external heat exchange. I know that is not a question to be answered here, but I'm just saying the reactor coolant that keeps the motor cool, that is part of the reactor coolant pressure boundary coils he was just referring to that are part of this, and it goes out to the external heat exchange. That's not a question to be answered here, I'm just saying. The cooled reactor coolant that keeps the motor cool, that's part of the reactor coolant pressure boundary. It goes out to the external heater. That's all straightforward.

The only question is, is there any threat to that extension of the reactor coolant pressure boundary outside the shell that we saw in the picture up there?

MR. HSII: Well, the external heat exchanger outside the pump is stationary. There is no moving parts there.

CHAIR RAY: Oh, I know. Well, it is an extension of the pressure boundary is the point.

MR. HSII: Yes.

CHAIR RAY: It is just a little --

MR. HSII: So that is why, because it is

outside of the heat exchanger. The outside of the pump and it is part of the reactor coolant pressure boundary. That is why we have to meet the ASME --

CHAIR RAY: I understand all of that. I'm just saying that it is likely that there is no threat to it. I am just saying that at some point that you are extending the reactor coolant pressure boundary now outside the big forging that is the motor casing.

MEMBER ABDEL-KHALIK: Now the pressure boundary, the reactor coolant pressure boundary is the tube side of that heat exchanger?

CHAIR RAY: yes-hum.

MEMBER ABDEL-KHALIK: Okay.

CHAIR RAY: Yes. It was inside; now it is outside.

MEMBER ABDEL-KHALIK: Now it is outside.

CONSULTANT KRESS: If you lose that cooling, does the pump stop pumping? Does the motor overheat?

MR. HSII: Eventually. The pump, you know, you might have a -- if the pump stops pumping, it becomes --

CONSULTANT KRESS: The pressure valve is

the secondary inside the heat valve. I just wondered if that was one of the initiating events in loss of flow.

MR. HSII: It's initiating when it becomes a loss of blockage.

CONSULTANT KRESS: Yes.

MR. HSII: So it is covered by Chapter --

CONSULTANT KRESS: It's covered in the PRA, you think?

The reason I ask is because it wasn't, that system wasn't part of the PRA before, I don't think.

CHAIR RAY: Loss of CCW?

CONSULTANT KRESS: We had loss of flow in there, but this is another initiating event for it, in my mind.

CHAIR RAY: Well, I just think, John, that moving the heat exchanger from inside to outside didn't change what the initiating events are.

CONSULTANT KRESS: Yes, except you put more pump, external pump and an external cooling system to this heat exchanger, which --

CHAIR RAY: Well, but you always had that.

MS. McKENNA: This actually is a topic in our presentation on Chapter 19, coming tomorrow.

CHAIR RAY: Okay.

MS. McKENNA: So maybe we can come back to it at that point.

CHAIR RAY: Fine. Good.

MR. BUCKBERG: If there's no additional questions on the DCD portion of the presentation, I will turn it over to Ravi Joshi to present the COL side.

CONSULTANT KRESS: I have one question on that.

CHAIR RAY: Please, go ahead.

CONSULTANT KRESS: You didn't stress the change in the insulation. I gathered that change was to accommodate the external cooling of the pressure vessel by flooding it?

MS. McKENNA: Actually, the reactor vessel insulation I think you are talking about is a severe accident feature.

CONSULTANT KRESS: It will bottom, right?

MS. McKENNA: Yes, that we will again get into tomorrow in Chapter 19.

CONSULTANT KRESS: You will get into that

tomorrow?

MS. McKENNA: Yes.

CONSULTANT KRESS: Okay, I will save my place.

(Laughter.)

MR. JOSHI: Good afternoon. My name is Ravi Joshi. I'm a Project Manager for Chapter 5, the Bellefonte FSAR.

The Bellefonte FSAR Chapter 5 actually incorporates the reference by EPRI, EPRI 1000, DCD Chapter 5. In addition also, Bellefonte FSAR Chapter 5 also describes how they provide information on the standard COL item as a last supplement of items also.

Basically, the entire chapter is really a standard content, and the slide that’s in front of me actually provides the items that are described in the Bellefonte FSAR, and the highlighted items that we will describe and discuss by data.

MR. TERAO: Actually, before I explain, go to my first topic, I wanted to explain a little bit why we are discussing standard COL items as opposed COL supplement items.

In our view, the COL items are more significant. The reason is that, if you think about

the overall Part 52 process, the DCD, 10 CFR 5247 says that a DCD should provide an essentially complete design. But there are some aspects of that design that are not complete that are now left up to a COL applicant to address. A lot of that, I will say, design that is not complete is related to as-built information.

So the COL items, the standard COL items that we are going to discuss today, a lot of them have to do with how the COL applicant is proposing to complete the design. So, from that standpoint, we think it is very important.

The overall staff guidance is that the staff needs to make a safety finding before issuing a COL license. We cannot defer our safety finding. We cannot defer completion of the design after a COL is issued.

If there are some things that need to be completed after a COL is issued, then staff is either going to make it a license condition or an ITAAC or possibly a licensing commitment. I think we had that discussion earlier this morning. We are still trying to decide at what level is it a license condition, at what level might it be a licensing commitment.

So the other items that are listed are standard supplementary information. In general, this supplementary information is, I would characterize it as clarifications or perhaps additional detail, more detail. It doesn't change the design and it doesn't conflict with the design, but it might help clarify and provide more details about what was discussed in the DCD.

So, from that standpoint, we are not going to discuss any of those standard supplement items, unless you had any particular question on them. So, with that, I will start with the first item, which is the plant-specific in-service inspection program.

The AP1000 DCD has an action for COL applicant to provide a plant-specific pre-service inspection and in-service inspection program, and it also has the COL applicant address the NRC's first revise order, EA-03-009. That is the order that required operating plants to inspect the reactor vessel for boric acid corrosion.

The ISI program is an operational program, that is, a program that is implemented during plant operation. It is discussed in

SECY-05-0197. The COL applicant should provide in its FSAR a fully-described program, meaning a program description and its implementation.

So for Bellefonte to address this COL information item, what happens is, for the ISI program, and each of these operational programs are a little different. For the ISI program, and for the AP1000 Design Center, the Bellefonte COLA, together with the AP1000 DCD, provides a fully-described program. The Bellefonte COLA describes more of the implementation of that program.

So, from that standpoint, we found that the AP1000 DCD, together with the Bellefonte FSAR, provide, adequately address SECY-05-0197 in providing a fully-described program.

With respect to the NRC's first revised order, TVA will revise its FSAR to meet the final amended rule to 5055(a). Currently, I think it is at the time the final rule had not been issued in The Federal Register. At that time, it was only the proposed rule. But, since then, on September 10th, 2008, the NRC issued the final rule in The Federal Register that requires reactor vessel head inspections be conducted in accordance with the ASME

code case and 729-1, as modified in 5055(a). So TVA agreed that they will now change the FSAR to reference this and the final rule.

Milestones for PSI and ISI are specified in the ASME code. So we didn't need any specific license conditions for when TVA should commence its PSI or ISI program.

As far as meeting SECY-05-0197 on providing milestones to the staff on program implementation, TVA proposed the license condition 6 in Part 10 of the Bellefonte COL application, again, consistent with SECY-05-0197.

From that standpoint, we found that there were no open items with respect to the in-service inspection and pre-service inspection program.

CHAIR RAY: David, as we go along here, a number of these conclude that there's no open items. I would just ask you to try to focus on things that may be of relatively more interest to us in terms of them being issues as opposed to --

MR. TERAO: All right. Well, I thought this would be interesting because it was an operational program and it is something relatively new to COL applications.

CHAIR RAY: Okay, that's fair.

MR. TERAO: The next one is P-T limit curve. Again, there's no open items here, but I just wanted to follow on and maybe we could do this one quickly.

Bellefonte committed to use the updated P-T limits, using the PTLR and using plant-specific material properties, and they proposed a license condition.

CHAIR RAY: We have this little explanation of these technical letters and their approval. It is an interesting feature of the regulatory process, I guess. Because, as we sit here now, that is like something that took place in a closet somewhere, I'm not sure where, and we will assume it is okay, but it doesn't have the same transparency, I'll say, as something that is addressed in an SER the way the curves themselves would have been, had they been included.

In other words, it is a protocol for determining a requirement. It is not a requirement itself. It's approved and has the status that would exist for including the curves specifically. I am trying to figure out how it fits in the spectrum of

regulatory processes from a standpoint of transparency.

MR. TERAO: But the overall process we used for approving the PTLR via the letter and all of this is documented. It is no different than the process the NRC staff uses for operating plants to approve PTLRs. It is just that in this case we don't have an operating plant; we have a Design Certification, but certainly our approval process via letter, and putting those letters on the docket, is consistent with our process used for operating plants.

CHAIR RAY: Yes. I'm just wondering, well, okay, what limits the scope of what you are going to do that way? But, again, there's too many side trails that we can get off on here. So you had better go ahead.

MR. TERAO: For our Branch, this is the only area where we have approved an item via a letter, and only because we wanted to be consistent with operating plants.

MEMBER BROWN: Can I ask one question? PTLRs, not knowing what people are doing with pressure temperature limit curves, do they just do

whatever they want to do, and you've got to take what they do, as long as they follow the methodology?

I guess my question is related to, does the methodology establish some principles relative to margins to material characteristics or does it leave those up in the air, to be determined by the licensee at the time he follows the method? In other words, do you put in some prescribed limits within which they have to operate when they do -- or does the methodology lay out a set of prescribed margins and limits within which they have to operate, or does the methodology just say you establish some margins and limits, and then they can just do whatever they want to do after that?

Was I clear in my question?

MR. TERAO: Yes. Neil is the subject matter expert on this. So Neil will answer that.

MR. NEIL RAY: This Neil Ray.

Let me try to address everybody's questions in a broad fashion.

First of all, pressure temperature limits is required for the entire Class 1 pressure boundary to make sure under any conditions there should not be any fracture of any Class 1 pressure boundary. It

does not include only the outer vessel. It includes the entire pressure boundary.

The second thing is P-T limits are deemed, they were logged, probably the last 40 years or so under this similar or exact identical methodology prescribed in 10 CFR 50, Appendix G, and in Section 11, Appendix G. So there is nothing new to it.

Now, to address your question, specific question, about PTLR, back in 1996, the NRC decided to allow the applicants, licensees, to take out their P-T limits outside the tech specs because, once it is in the tech spec, every time there is any new P-T limits, they have to get NRC's approval and tech spec amendments, which is a pretty expensive process.

As you know, in a particular reactor vessel, the only thing that changes with time is the radiation embrittlement. Everything remains a constant, including your reactor vessel diameter, thickness, cooling temperature, heat-up rate, cool-down rate. Everything remains constant. The only thing that changes is your radiation embrittlement.

So, back in 1996, there was a generic letter in 1996-03, where the NRC allowed licensees to

take out the P-T limits outside the tech spec and being in the administrative control.

When NRC did it, we have, as I said before, we have seven criteria to make sure that licensees will use the same procedure over and over again, anytime they change the procedure. That includes risk calculation. That includes your fracture mechanics calculation. That includes any sort of risk calculation data, pullout and subsequent treatment of the data. Anything changes, the whole process will start all over again.

So the PTLR is applicable only when your methodology remains constant. Your methodology remains constant. The only thing you are changing is the radiation embrittlement or, in other words, RTndt. That is precisely the process.

CHAIR RAY: Thank you.

MR. TERAO: All right, the next slide is on the reactor vessel surveillance program. Again, this has no open items. So I just want to point out very quickly that this is another operational program that was fully described in the Bellefonte COLA and the AP1000 DCD together, as discussed in SECY-05-0197.

The Bellefonte COL application also provided the two requisite license conditions, proposed license conditions. So, from that standpoint, we found the reactor vessel surveillance program, the operational program to be acceptable.

Next slide.

The next slide is on the reactor vessel material properties verification. This issue deals with the pressurized thermal shock issue.

Just real quickly, as part of the Certified Design, Westinghouse described its bounding PTS evaluation, and so nothing changed there. The only thing that is happening here with the Bellefonte COLA is that the Bellefonte, TVA committed to provide the NRC with the plant-specific beltline material properties prior to fuel load, and that they will provide a pressurized thermal shock evaluation using these plant-specific materials to the staff at least 18 months prior to fuel load, to give the staff ample time to review it. These two commitments were actually captured as proposed licensed conditions.

MEMBER BANERJEE: Do you need the sort of flaw distribution to be able to do an evaluation of the PTS? There is some sort of flaw distribution,

isn't there?

CONSULTANT KRESS: They have to have a flaw distribution --

MEMBER BANERJEE: Yes.

CONSULTANT KRESS: -- number and size.

MEMBER BANERJEE: So that is not a generic thing, I guess. It is specific to each plant, right?

CONSULTANT KRESS: No, they use the old data off of the old reactor vessels. They only have one source of data.

MEMBER BANERJEE: Right. That's for the rule, but I'm saying for any new vessel, does there need to be a determination of this?

CONSULTANT KRESS: I think they just assume the loading.

MEMBER BANERJEE: Can you guide me through this, please?

MR. NEIL RAY: Yes, let me address that.

As you are well aware of, pressurized thermal shock issue was first addressed back in 1986 or so. Since that time, original PTS rule, which is in the 10 CFR 5061, is based on at least some 2,000 transients with flaw distribution as bursts of energy

in the original PTS rule, 10 CFR 5061.

What we did, industry, along with the NRC, is for going through each and every vessel and going through the flaw distribution is so extensive and expensive, it really doesn't make much sense. So we made it a rule-of-thumb kind of a rule and what we call a PTS screening criteria, which in a nutshell is 270 degrees Fahrenheit for longitudinal weld for blades. For circumferential weld, the criteria is 300 degrees Fahrenheit. These two criteria, screening criteria, is based on lots and lots of studies, including flaw distribution and transients temperature, LOCA analysis, all those things you can think of.

So, based on that, the current reactors, current PWRs, all of them have to follow these guidelines and they have to maintain their vessel below this screen criteria.

Now coming to new reactors like AP1000, the AP1000 also following the same criteria of PTS 270 and 300 degree with the similar understanding and similar assumption of what I just described, on top of it, for everybody's good feeling, I would say that the AP1000 vessel, as they pointed out, copper and

nickle content will be much, much lower than what we have seen in the current reactors. Also, the initial activity also will be very, very low.

So they are proposing much, much better materials in the beltline region of the AP1000 vessel. Hereby, if I remember the number correctly, as per Westinghouse's calculation, up to 60 years, the number is something like 136 degrees Fahrenheit, instead of 270. So there is virtually no concern whatsoever for PTS.

MEMBER BANERJEE: Thank you.

MR. TERAO: Okay. The next, last item is on the steam generator tube surveillance program. This item is related to the in-service inspection program. Of course, it is specifically for steam generator tubes.

Again, this item, it is an operational program. The TVA provided a description in its FSAR of the Bellefonte steam generator tube and surveillance program. The staff found it acceptable because it is based on the standard tech specs for Westinghouse plants. It is based on NEI 97-06 on steam generator program guidelines, and it is also based on EPRI steam generator guidelines, which is

consistent with industry practice.

So, from that standpoint, the staff found it acceptable with no open items.

And that concludes my presentation.

CHAIR RAY: Okay, thank you very much, David.

MS. COFFIN: Mr. Ray?

CHAIR RAY: Yes?

MS. COFFIN: I would like to comment?

CHAIR RAY: Go ahead, Stephanie.

MS. COFFIN: There are two comments I heard from you and Dr. Brown that I wanted to not let -- Mr. Brown? Sorry. I'll exault you.

MEMBER BROWN: I plead guilty on -- I appreciate the increase in my degrees.

MS. COFFIN: There were comments that you made that I would like to address for the record.

One, you expressed concerns about transparency in our process. If you think something in the PTLR approach is not transparent, we need to address that, but we believe the methodology was rigorously reviewed, documented in a Safety Evaluation Report that is publicly available, and will be very clear in the DCD and the FSAR what

methodology and the approach we are taking. So, if there's any remaining concerns, please let me know.

CHAIR RAY: Stop right there because you said some keywords, which were it will be documented in the SER?

MS. COFFIN: Yes. It is.

MEMBER BROWN: SER or FSAR?

MS. COFFIN: There was a Safety Evaluation Report approving the PTLR methodology.

CHAIR RAY: Okay, that is what I'm searching for.

MS. COFFIN: Then in the DCD, we have asked Westinghouse to point to that, so it is very clear what they are doing. In turn, Bellefonte, or any applicant that chooses to use that approach, it is going to be very clear in their licensing basis how they approaching this.

CHAIR RAY: Does that process come through here at all, that exists with the SER for the PTLR?

MS. COFFIN: We have an obligation to bring to the staff any kind of generic topical reports that we think you have not seen.

CHAIR RAY: This seemed like an exception

to that. That is why I am asking.

MS. COFFIN: And if you have concerns with it, we will come and present it to you, but I think, from our perspective, this PTLR approach is in such common usage now that we didn't think it rose to the level of bringing it here for review and approval prior to issuance.

CHAIR RAY: Well, but that is the question, and you have given me your judgment about that, and I don't have any reason to disagree with it. It is just that that is what I meant what I said transparency.

MS. COFFIN: Okay.

CHAIR RAY: I didn't understand. It seemed like an exception to the normal process.

MR. JOSHI: Can I make a suggestion? There is an SER page 5-26, the last paragraph, which actually references what staff did in terms of the PTLR and where it was approved and what date --

CHAIR RAY: Well, I did read that, and that is what I'm still pursuing here. It seems like maybe I'm spending more time on it than I should.

MS. COFFIN: But I think it is fair that your observation that it is somewhat unique, whereas

other Design Certification documents that reference topical reports, you would actually see the meat and the basis for our acceptance of those topical and technical reports. This one was an exception in that regard. So I understand why you were puzzled about it.

CHAIR RAY: Right. Okay.

MR. TERAO: If I may add, the Westinghouse -- the AP1000 Design Center is setting the precedent for the use of the PTLR for new reactors. I'm sure Neil can attest that we are now getting requests to use PTLRs and ESBWR and some of the other Design Centers as well. But this is setting the precedent.

CHAIR RAY: Well, I would like, Mike, to figure out a way to capture this process that we are just now discussing and make sure the entire Committee is aware of it. Okay? I don't want to again take everybody's time trying to pursue the bunny trail here in detail, but it seems like something that we should take note of and make sure that everybody is comfortable with it.

MR. NEIL RAY: Again, this is Neil Ray.

If I may add something to what Stephanie

and Dave told, in the DCD, in our safety evaluation, you will see that we discussed the process, the methodology, quite in detail. Anybody who knows the subject can evaluate the P-T limits based on that methodology.

We discussed how did we arrive at those numbers. What it does not say, showing if one plus two equals three, we didn't go into that detail, but other than that, you will get everything.

One thing you will not get is we did not show the P-T limit cuts.

CHAIR RAY: I understand that you are saying the stuff that we are not getting. No doubt, all of us would agree we don't need to get.

But I'm still not clear enough, and I don't want to pursue it any further here, on whether, if anybody had any concern about it, they would ever have a chance to recognize what had happened. Okay?

MS. McKENNA: Okay. It is the reference to the PTLR and the staff safety evaluation of it is referenced in the FSER for the Design Certification Document. So, to that extent, there is a trail of where that information exists.

CHAIR RAY: Eileen, I admit to coming

into this process at this point in time, and there's a lot of history that I'm not familiar with. But, once again, I just want to, for purposes of the Committee, make sure, if there is a question here, that we understand what the question is.

MS. McKENNA: Absolutely.

CHAIR RAY: Then we can discuss it among ourselves.

MS. McKENNA: Yes.

CHAIR RAY: But I don't want to mischaracterize it, either.

MEMBER BROWN: I would like to make sure that the answer he gave to me, when I asked the question, in my limited knowledge, put some boundaries in terms of the flexibility, and was there some specific procedures and things outside the licensee's ability to go change or use new ones --

MR. NEIL RAY: That is correct.

MEMBER BROWN: -- without coming back, where you have a more structured and --

MR. NEIL RAY: Yes.

MEMBER BROWN: -- evaluation of them. That is what I was looking for, something that puts some boundaries.

MR. NEIL RAY: Yes.

MEMBER BROWN: So it is just not all over the place, and you pick and choose --

MR. NEIL RAY: Exactly.

MEMBER BROWN: -- what analyses or what techniques or what --

MR. NEIL RAY: Yes, yes.

MEMBER BROWN: So, if I could include that or get that from him, and put it in the --

MR. LEE: Yes. What I will do is I will work with Stephanie and Eileen to kind of work up that history and put something together and get it to the Committee, so that they can understand it.

CHAIR RAY: I will stipulate that there is no reason for concern on this particular application. I'm trying to understand the process and how flexible it might become.

MR. GRANT: Can I offer up two points on that that might help?

Eddie Grant with NuStart.

The pressure temperature limits report, the methodology, and specific reference to the WCAP that was used by Westinghouse is specified in the technical specifications. So, if they want to use

any other methodology except that one, they have to go, we would have to go back for a technical specification change, and give the staff an opportunity to re-review that methodology. So it is covered there.

It is also your opportunity, if you wanted to look at that, through the technical specifications, you would have an opportunity.

CHAIR RAY: Okay.

MR. GRANT: The second point I would like to make, if I could, is that it is not -- while it is unique, and the first time for the pressure temperature limits report, it is not particularly unique because we do the same thing with the core operating limits, and there is a core operating limits report also in the technical specifications, where we pull those particular items out of the tech specs and control those under a methodology WCAP piece of information outside of the tech specs.

CHAIR RAY: All right. Well, that may be a good illustration of what I am saying. Something that has been accepted for as long as I have been around now is being applied to something else.

MR. GRANT: Correct.

CHAIR RAY: And the question is, well, that seems like it worked that time. Why don't we just do it on a lot of other things? What are the limits that exist for expanding the process to other stuff that we might think this would be a swell way to speed up the process? That is what I am really getting at.

And I really don't want to spend any more time on it now. Okay?

Okay, where the heck am I? It is time for -- let's see, it's 2:20. We were going to have a break at 2:35, but we would like to get in Chapter 10.

Chapter 10 is going to be a long chapter, I've got a feeling, review.

MR. LEE: Do you want to take a break now?

CHAIR RAY: Well, I'm thinking about that, but, honestly, I am concerned about where we are timewise.

Rob, you're going to start?

MR. SISK: Yes, sir. If we could, Mr. Chairman, I would like to see if we can get the phone on our subject matter experts that would be available

to address the discussion.

CHAIR RAY: All right. That does it, gets a break.

(Laughter.)

(Whereupon, the foregoing matter went off the record at 2:22 p.m. and went back on the record at 2:32 p.m.)

CHAIR RAY: Let's come back to order.

May I ask the people on the telephone line to put their speaker phones on mute? It's quite distracting here in the meeting room.

So we are ready to resume. Chapter 10, and beginning with, Rob, I guess you would start.

MR. SISK: Yes, sir. Thank you.

Online we do have some subject matter experts: Keith Schwab, Dan McDaniel, John Vanderhurst, Doug Shala, and Bill Pantis. They will be available to address some of the more in-depth questions you may have.

In Chapter 10, this chapter really discusses the steam and power conversion portion of the plant, if you will.

We have only identified three changes in that area of interest. We provided the interval of

turbine valve testing -- I'm sorry, is someone driving?

(Laughter.)

Thank you.

We identified or we revised the interval of the turbine valve testing from a three-month to a six-month interval, really kind of based on the operating experience.

We revised the turbine layout to accommodate Toshiba turbine design. We talked about it briefly this morning, the switchout from MHI to a Toshiba turbine.

In the switchout of the turbine, we incorporated the Ovation turbine control system for turbine control.

CHAIR RAY: So, in looking at your presentation here, I notice you've only got one more slide which goes to the open items, the confirmatory items.

These are major changes, as you say. I guess I would say to you that, from my standpoint anyway, turbine generator overspeed is one of the biggest threats that exists, particularly in a multi-unit plant like this, like Bellefonte, I should say.

I realize the DCD deals with one single unit. Nevertheless, we can't ignore the fact that we are imminently looking at a multi-unit plant where turbine missiles are a huge threat.

So I read at least what the staff had to say about your change in the turbine intercept valve testing frequency, for example. I guess I will tell you I'm not persuaded by the argument that at least they summarize. I haven't studied your argument yet, but just from what you said, for example, tell me again why you think that it is a good idea to change the test frequency from three months to six months.

MR. SISK: Well, let me turn that over to -- Keith, are you online?

MR. SCHWAB: Yes, I'm here.

MR. SISK: And can you discuss the changeover or the interval for the turbine valve testing?

MR. SCHWAB: Yes. Again, it is part of the probabilistic missile evaluation input. It is a look at operating history of existing turbine valves and the potential of their failure to not close.

When we did the WCAP report for valve testing, we saw that we could meet a six-month test

interval with the analysis in hand. Coupled with the fact that today's operating units typically use a six-month test is we proposed the change from three months to six months.

CHAIR RAY: Well, I don't have any immediately available rebuttal to the idea that statistics prove that this is an okay thing to do. But I will say I ran a machine like this for many years, two of them, actually, at San Onofre, a single-shaft machine with an MSR and low-pressure turbines that have these big intercept valves that can very easily overspeed if the intercept valve doesn't close.

We learned a lot about it. Now that was then, and this is now. So I am not trying to transfer that experience glibly. But, nevertheless, I will say one more time that the issue of overspeed, and particularly if a single low-pressure turbine intercept valve doesn't close, you are in a world of hurt when it comes to overspeeding the turbine and a loss of load.

So I would just say that this warrants some careful review. It is not that it can't be shown to be okay. I don't mean that. But I just

don't think it can be brushed off as -- and I'm not saying you are trying to brush off, either, but the point is it is an important issue to me. Turbine overspeed missiles are a real hazard.

MR. SISK: I appreciate that, and certainly recognize the importance of turbine overspeed.

Would you like more of a discussion of it?

CHAIR RAY: Well, I think the thing to do will be to explore the conclusions the staff has reached, when it is their turn.

MR. SISK: Okay.

CHAIR RAY: It is more a matter of finding out from you what the basis of your conclusions is and whether the data that you are using is truly applicable to the -- for one thing, for example, is the PRA analysis that you would be doing really only applicable to a single-unit site where turbine missiles are not a significant issue, as they are in a dual-unit site?

MR. SISK: Well, they did do the probability on the missile analysis for turbine.

CHAIR RAY: I know, but for a single-unit

site it is not a --

MR. SISK: Well, the criteria is for favorable/unfavorable orientation.

CHAIR RAY: Yes.

MR. SISK: And we meet the requirements for an unfavorable orientation.

CHAIR RAY: On a single-unit site, you do, that's right.

MR. SISK: Correct, I guess.

CHAIR RAY: And I'm saying, therefore, my concern probably is for a dual-unit site, not for the DCD and the single-unit design. So maybe the question is, well, every six months is okay for favorable orientation, but not so okay for an unfavorable orientation, for example.

MR. CUMMINS: Yes. This is Ed Cummins.

I think what Rob is trying to suggest, that we actually had an AP1000 have a favorable orientation for the single unit.

CHAIR RAY: That's right.

MR. CUMMINS: But we might have an unfavorable orientation for the neighboring unit.

CHAIR RAY: That's correct.

MR. CUMMINS: So we use an unfavorable

orientation criteria to assess the probability for the second unit.

CHAIR RAY: Okay, and was that -- maybe I misunderstood -- is that what you assumed in concluding that six months was okay, unfavorable orientation?

MR. SISK: Yes, we have an assumption that the unfavorable orientation is the assumption we are using.

CHAIR RAY: I see. I misunderstood.

MR. SISK: So, before I go into the open items, you're right, we don't have a lot of slides here because I really wanted to kind of be prepared to address your questions and concerns, but I will move into the open items at this time then and just describe the open items: overspeed protection system, meeting single failure criteria, an ITAAC confirming diversity between overspeed. Obviously, there's a lot of importance to overspeed protection. Backup turbine speed sensors. We talked about low-trajectory missiles, and clarifying a discrepancy that was found in the missile analysis.

Clearly, I mean you hit on an area that is an area that we are also paying a lot of attention

to, the staff is paying a lot of attention to, and we are working with the staff to make sure we have that adequately covered.

MEMBER BROWN: Did you want to talk about these systems here or do you want to wait until the --

CHAIR RAY: Yes. No, no. This is the time, Charlie, I think, when we can do that. So our expert is right here. But I think what we are focusing on is the open items.

Let me just introduce it, Charlie, by saying, as I read this, basically, it becomes DAC. There is a design acceptance criteria for the overspeed system design.

MR. SISK: No, sir, I don't believe we have a DAC in this area.

CHAIR RAY: Well, okay. Then perhaps I will have to take a minute.

MEMBER BROWN: I had the same impression you did, Harold.

CHAIR RAY: "Tests analyses to confirm the design acceptance criteria requiring diverse hardware, firmware, and software between the two overspeed trips are met." This appears on page 10-7

in the second paragraph.

What?

MEMBER ABDEL-KHALIK: It's an ITAAC.

CHAIR RAY: I know, but a subset of ITAAC. I assume we're talking about DAC here because it says, "to confirm that the design acceptance criteria requiring diverse", blah, blah, blah, "are met."

MS. McKENNA: I think, unfortunately, the use of design acceptance criteria has come up in a couple of different contexts and it gets confused in terms of criteria that the design has to meet. That is what we are talking about here.

When we have used the term "design acceptance criteria" as DAC, it is those portions of the design where in the DCD review we established assumptions, criteria, methods by which that design would be finished. That is what we refer to as DAC.

CHAIR RAY: Well, but, Eileen, it says right here the design isn't yet done. I mean I think we're into sophistry here.

MS. McKENNA: Maybe.

CHAIR RAY: The design isn't done. We have established design acceptance criteria. You can

call them whatever you want to, but I think that's what we -- I just wanted to say that that's I read this anyway.

If there is a difference between this and other things that are called DAC, okay, fine. We will get the lawyers in to debate that.

But the point is you say the design isn't yet done. We've established ITAAC to confirm that the design acceptance criteria requiring diversity are met.

MR. REDDY: But, Mr. Chairman -- Devender Reddy -- actually, when we wrote the SER, I mean after we wrote the SER, the applicant provided a response to these questions, and we reveal that actually a couple of open items will be closed, but we also confirm that this ITAAC one will be still open.

CHAIR RAY: Okay, but I don't know that you have changed anything I said.

MR. REDDY: Well, what I am trying to explain is, when we mention in here in this paragraph, it will be revised, based on the response that we are believing currently. The response came on July 7th in a letter dated June 12th.

Let me discuss that later on.

CHAIR RAY: Well, I don't know. If it is more appropriate later on, we certainly should do it then.

I'm just trying to read the plain English in the SER here, and it is applicable in this chapter and talking about the fact that we haven't designed this thing yet, but we promise that there will be diverse hardware, firmware, and software.

So the question, well, let's get on with the question and quit debating about whether it is DAC or not. The real issue is, how are we going to resolve this in this meeting, diversity in hardware, firmware, and software between the two overspeed trips? How is that going to be done? When is it going to be done?

MR. SISK: Part of that discussion will be later, when we do talk Chapter 7, the I&C control systems, and, yes, there are portions of DAC that are associated with that.

With regard to the turbine overspeed trip, I don't think there -- in this section, I think, as indicated, we have a response such that this is not where the design acceptance criteria is,

as much as completing the I&C system, which we will talk about in Chapter 7.

CHAIR RAY: Well, that may be, but we are in Chapter 10 now.

MR. SISK: Yes, sir.

CHAIR RAY: So tell me how this is going to get resolved, what I just referred to.

MR. SISK: Okay. I believe Mr. Pantis -- Bill, are you online?

MR. PANTIS: Yes, we are.

MR. SISK: Can we talk a bit about how we are resolving the overspeed trip for the turbine?

MR. PANTIS: What we wrote in the RAI is basically to provide diverse hardware, software, and firmware that is not Ovation-based. We are currently performing an evaluation and have narrowed it down to three vendors and are awaiting some internal communication to coordinate a meeting. We are hoping as early as middle of August to provide our recommendation to get further direction from the technical management group.

We would have a solution to which we can better provide a description as to vendor and how this would work. Again, it will not be an Ovation-

based hardware, software, firmware system.

CHAIR RAY: That's good, but I mean, still and all, it is a question, if you don't want to call it DAC, don't call it DAC. But how is it to get resolved, is the question on the table. We have heard a little bit here.

MR. SISK: I think the issue from our perspective is, and is identified in the open items as an item that we are working with the staff to get an agreed-to position that would allow us to close it out, close out that open item in this review. We are not quite there on closing the issue out with the staff yet, but we are working to get it to that point.

Unlike what I think introducing a new DAC, which would be something that we would be doing much later into the future, we believe we can close this out from an open item perspective.

CHAIR RAY: Okay. Well, as I say, we will pursue this maybe a little bit more, and Eileen can explain it to us further later. So I don't want to --

MR. CUMMINS: So this is Ed Cummins again.

I believe what we're trying to say is that you can purchase these overspeed trip devices from various vendors, and we are trying to select a vendor. When we select a vendor, then we must demonstrate to the satisfaction of the staff that it is diverse from the original overspeed limiting devices, which are Ovation.

CHAIR RAY: I know. I can read that. I understand that that's what is happening. That doesn't, though, tell me, Ed, what the process will be that we are engaged in today for us having visibility on how that is resolved.

I think if I turn to Eileen, I can get an answer.

MS. McKENNA: Okay.

CHAIR RAY: In the six-step process, this thing is going to be closed when we come back here with the final?

MS. McKENNA: Yes.

CHAIR RAY: And you will tell us how it was done?

MS. McKENNA: Yes. Yes.

CHAIR RAY: Okay. Because that, you see, isn't stated here. What is stated here -- and again,

I'm not talking about what you guys wrote; I'm talking about what staff wrote -- is: just let me read it.

"The staff finds this acceptable", what you have said. "However, the staff's position is Westinghouse should update Tier 1 and 2 sections of the DCD with ITAAC to confirm the design acceptance criteria regarding diverse hardware, firmware, and software between the two overspeed trips are met." Identify this as an OI.

Okay. What I heard earlier today was that all of the OIs would be closed at the time the final SER comes forward, and we will be told how it is closed at that time.

MS. McKENNA: Correct.

CHAIR RAY: So this isn't going to be an ITAAC that goes off into the post --

MS. McKENNA: Well, I mean, if there is an ITAAC, it would be an ITAAC that is an ITAAC, if you will, something that has to be verified through specific acceptance criteria that would be stated --

CHAIR RAY: All right, but it is not going to be a DAC.

MS. McKENNA: No.

CHAIR RAY: All right. But you understand, because the words "design acceptance criteria" --

MS. McKENNA: Yes, I understand the confusion. Yes, I do.

CHAIR RAY: -- were used here, that that is what it sounded like?

MS. McKENNA: It does. I agree.

CHAIR RAY: Okay, Charlie?

MEMBER BROWN: Well, there were some comments in the DCD part of this where they referred to including it, that they had included something in Tier 1. So I went off and found Tier 1, and they considered there's a table, table 2.4.2-2, and they added the emergency electrical overspeed trip device in the turbine-building for that table, and that is the ITAAC section for the main turbine system.

If you look at the ITAAC for the main turbine system, it is virtually non-existent. It just says we'll run the thing up and it will trip the thing, but it doesn't confirm any other either diversity or independence criteria or anything else.

I just had a couple of questions I wanted to ask, if I could, of the Westinghouse people --

CHAIR RAY: Go ahead.

MEMBER BROWN: -- relative to the independence. And I'm going to be talking from the DCD presentation that you gave.

It appeared to me -- and put aside triplicate redundant processors and all that kind of stuff; I'm not focusing on that -- but it appears that your speed control and overspeed protection functions, run through the Ovation system, are all in that processor. They are all software-based, including, the way it is written, what is called the electrical overspeed trip. It sounds like they all are running through the same system.

So I agree with the staff, whatever they are doing relative to you've got to have something that independent. They don't appear to be independent from the speed control, totally independent.

So it is good. I like the diversity, put something that has no connection to that system in for an overspeed trip device.

So is my conclusion correct? The way I read this is that speed control -- this is what you stated in the DCD -- and your overspeed protection

functions, both the 110 and the 111 -- it says that right in paragraph 10.2.2.4.1 -- are all part of this master controller. So is that a correct conclusion? Or is that that they are not truly independent in that circumstance?

MR. SISK: Bill, would you like to comment on the independencies of our overspeed protection?

MR. PANTIS: It is independent.

MEMBER BROWN: How? There is no figures that show that I've got an overspeed function with no connection to the speed control. It is just a bunch of words.

MR. PANTIS: Controllers.

MEMBER BROWN: Plural? A word is plural, and I am supposed to walk away happy with that, right?

MR. SISK: Say more.

MR. PANTIS: The VCB wasn't supposed to go into separate controllers and separate functions. We weren't even supposed to use the word "Ovation-based".

MEMBER BROWN: And that is repeated in a couple of the other places as well.

PARTICIPANT: That is the problem right there.

This is Bill. I'm the Engineering Manager for the product line over at turbine control.

Going through the DCD, and we're looking at Section 10.2-4 of Rev 17. Are you referring to -- let me just ask you -- are you referring to Rev 17 of that chapter or Rev 7?

MEMBER BROWN: Yes, I've got Rev 17, and I'm in Section 10.2.2.4.5 and 10.2.2.4.1.

PARTICIPANT: Okay. We are looking at 10.2.2.4.1, which is titled, "Speed Control".

MEMBER BROWN: Yes. Those sentences says they are all developed from the same controller.

PARTICIPANT: Yes, and that is a misstatement there. There is actually independent controllers. The two overspeed functions, we do have one of the overspeed functions is implemented in what we call the OA drop or the OA controller, as it is referenced in this particular paragraph.

The other 111 percent overspeed trip

function is implemented in a separate controller that we call the emergency trip system. So we actually have what's written up in here, actually, references two independent overspeed trip functions that are implemented in separate hardware and software.

MEMBER BROWN: Do they have separate sensors as well?

MR. PANTIS: It causes 110 percent overspeed. I assume this paragraph was written correctly.

PARTICIPANT: Yes. The sentence right there, if you look at that, the one we are looking at, it says -- and I will read the sentence -- "The operator automatic controller provides the speed control function and also contains the redundant 110 percent and the 111 percent overspeed trips."

That and the 111 percent overspeed trip is a misstatement.

MR. CUMMINS: This is Ed Cummins.

I think we are best to take this offline and get a straight answer back to --

MEMBER BROWN: Yes. I will cut to the choice. Okay?

You could simplify this process. Nobody seems to have heard anymore, when they write up these descriptions, that some functional block diagrams with some specificity in them to show how you do a few things with here's my speed control, here's my overspeed, and you see no -- there's just like walls between them, and you show that you've got separate power supplies. They may be redundant, whatever you want to do, you know, redundant, for each independent.

That resolves it, and therefore, you don't need 5,267.3 words, and we end up with the same confusion.

My major concern here is just independence relative to speed control. I'm not worried about how you do the thing, but if you don't have the independence with the software, you're kind of toast; you can't prove anything.

So that is fundamentally, that is easily

resolved with two or three figures that give a block diagram representation of these particular fairly pretty critical functions, because you don't want to kill anybody. And we've got to walk away with some comfort on that.

So I can stop there.

MR. SISK: But it is a very good point, and I have to agree. We will be talking more about this as we go to Chapter 7. I think that independency is --

MEMBER BROWN: Well, you're going to hear this again --

MR. SISK: Yes, we understand.

MEMBER BROWN: -- when we get to Chapter 7, the lack of any way to determine if your systems, channel-to-channel, division-to-division -- I've always scanned quickly Chapter 7, just to see how lacking in figures it was to try to show the independence, in addition to the redundancy, which you state you have, as well as the diversity. I see the DAS system also.

So, anyway, the figures somehow to come across and show us this, as opposed to trying to figure it out with words. I mean I spent a day trying to draw little diagrams from the words, and it just fell apart after a number of inconsistencies.

So I can stop now and we will go on.

MR. SISK: We will take that --

MEMBER BROWN: I am done with my sermon.

MR. MOTT: Mr. Chairman and Dr. Brown, this came up and they're working on the I&C portion of this. My only concern was the initial response in the RAI and they've since updated the revision. And to your point that we are all in the same place, if you kill it one place, you kill all the protection that you have in the different cabinets. To point out, it is still an open item. We are still evaluating the ITAAC itself.

The information that was placed in a response, this information should be placed in the FSAR, and still say what should be here and why should it be put here. So a review is not complete.

But to your point, one of them is incorrect, they should not be in the same place, and they never envisioned -- they have changed it to where they have moved them in a separate place, physical location, to demonstrate independency.

MEMBER BROWN: Don't get me wrong. I'm not a big fan of the old mechanical weights flying out and doing it. They work, but there was one of them, and they are hard to test. So there's a lot of advantages to doing this. It is just the electrical area, I've already had one problem where we almost destroyed a machine at a hundred and -- by the way, what is the design speed for the overspeed for this before it flies apart, for this generator, the turbine generator set? Is it 130, 120, 150?

MR. REDDY: Actually, the number, it is 120.

MEMBER BROWN: A hundred and twenty?

MR. REDDY: But, actually, what we have done, what is mentioned is 112, 111 and 112.

MEMBER BROWN: Right. So you've got an 8

percent margin before the design of the machine will theoretically fall apart?

MR. REDDY: Yes.

MEMBER BROWN: That's enough.

MR. SISK: And we will take the action that, just in general, the next time we get together on I&C, we will have some good background for you.

MEMBER BROWN: Okay, and on the ITAACs. One of the points on ITAAC for this type of stuff, I mean that's like an inspection. You really need to resolve this, like you said, at the design stage when we get the final FSER or SER, the final FSER, I guess.

MR. MOTT: Just some background of the history of this, the staff -- it's pretty unique to me where SRP -- generally, I'm Chapter 7 myself, INC. We tell the applicant or the vendor that, if you have a software, digital-based primary detection system, then you need to have a diverse system. You need to have a lower diversity shown in both of the systems, not come with the same common-cause failure.

We don't tell them how to implement it. We don't say make this one software, make this one pure analog. We give a document --

MEMBER BROWN: I have no problem with that. I'm not angry about that.

MR. MOTT: It's kind of odd with the SRP for Chapter 10 -- like I say, I'm a Chapter 7 guy -- we explain to the applicant what we expect. We tell them that I think it's 110 percent, 109 percent, and one will be mechanical, and 111 percent, the other percent, one will be electrical. We don't give them an option.

MEMBER BROWN: It becomes an exception, is what you are saying?

MR. MOTT: Exactly. So, under Rev 15, and that one doesn't require an ITAAC; anyone can go see the mechanical system and see the electrical cabinet, electrical block, and, hey, that is diverse. That is sufficient, inheriting it that way.

When they made the change in Rev 17, Rev 16 to 17, to go electrical-electrical, that brings

the entire analysis of Chapter 10 that wasn't there. We followed the SRP guidance. One is mechanical; one is electrical. They didn't state the Ovation system or anything from that one. It is just is as it is because, due to the inherent diversity, we were happy with that.

Now they are bringing electrical-electrical. What can we bring in to this non-segregated system such that it would have the same level of diversity that a mechanical-electrical system would have.

So part of our review is what the criterion states that we are going to hold them to, and what is, to your point, you bring up some very great points here.

MEMBER ABDEL-KHALIK: I have a process question. As pointed out by Charlie, and acknowledged by your experts, there are factually incorrect statements in Rev 17. What is the process for correcting that material?

MR. SISK: With regard to the DCD, we

continue to look to see if there are -- as you know, we caught up this morning on the slides, looked at inconsistencies or any errors in the DCD. We will continue to try to incorporate or address them.

We will bring, if there are substantive errors that need to be corrected that fundamentally this may be one that is a change, we will either correct them through the RAIs as they are identified, through the evaluation process, or we may self-identify those and correct those in a revision to the DCD, as we are doing. But, mostly, we are picking these up and correcting them through the RAI process.

MR. CUMMINS: This is Ed Cummins.

We still have an RAI for an open item that says we have to demonstrate that we have a diverse overspeed.

MR. SISK: Right.

MR. CUMMINS: So, when we make our arguments there, we need to fix the other things.

MR. SISK: Which is what happened with --

MEMBER BROWN: Let me make one

observation on diversity, if I can, Harold, if you don't mind. And it doesn't necessarily apply to the overspeed.

When you look at the diverse actuating systems in the I&C reactor protection and safeguards world, you normally do what I call a less conservative analysis for the diverse system. It is a best estimate, as opposed to a worst case, or whatever the new definitions are.

So, when somebody tells me that, oh, gee, we've got a diverse system over here; therefore, it doesn't matter what we do over in the full-bore protection system, that doesn't walk down the aisle very well. That doesn't make sense because you don't have the same level of protection for the plant on the diverse system. It is there as a backup. Therefore, you are allowed to make it less complicated with a less complicated analysis, and all that, to show that it works. Perfectly acceptable. I have no problem with that.

It is just that the No. 1 protection

system in both the safeguards and the reactor world have to be armor-plated. That is the reason for, I guess, the importance of the independence factor when you are looking at those reactor protection systems and safeguard systems.

In this system, 120 percent overspeed is 120. I don't think you change your design criteria when you set your setpoint for the diverse system. I mean you just put one a little bit above the other ones, and you say, okay, that's okay. So it is not really apples and apples.

Anyway, I just wanted to make that point. There is a little difference there, but I wanted to make the point relative to the other systems on the diversity side of it.

MR. SISK: Thank you.

CHAIR RAY: This is all important and necessary, and it is the reason we take the time to come here, is to have this kind of discussion.

But I do need to give everybody a time check. Now we are running about an hour and a half

behind.

Because of tomorrow's agenda and the constraints on tomorrow, we are going to try to press through and finish the agenda here, so that people aren't traveling in anticipation of meetings and have them not take place. So fair warning that it seems those that have been here now will be here until well after the time set on the agenda. Who knows, it may speed up.

Nevertheless, this is, as I say, important --

MEMBER BROWN: I will restrain myself.

CHAIR RAY: -- important discussion. Of course, all of us, as members of the Subcommittee, speak for ourselves individually at this point, and our inputs are to the full Committee, who will wind up with whatever opinions result.

So, with that in mind, I would say to you guys and to the staff that this is an area in which, obviously, it's a work-in-progress. How it was to be resolved wasn't totally clear to us coming into this

meeting. We understand we will have a chance to see the resolution before the final signoff on the DCD revision or Design Certification, I should say.

Okay. With that, then, let's see if there's more on Chapter 10 that we want to direct to the applicant.

MR. SPINK: Good afternoon. I'm Tom Spink. I'm the Licensing Project Manager for Bellefonte 3 and 4 from TVA.

On the phone I should have three individuals: Frank Kenny, Pat Garnier-Davis, and Navin Shah, if the need arises.

The content of Chapter 10 is the usual content: 10.1, a summary description; 10.2, the turbine generator; 10.3, the main steam supply system, and then 10.4, other features of the steam and power conversion system. As you can probably guess, most of this is IBR.

We are required to address some items, the COL items. The first one is erosion and corrosion monitoring system. Despite the best

efforts by Westinghouse to eliminate flow-accelerated corrosion as a factor, you just can't take it at that. You have to reassess based on the actual plant.

We have provided information on the erosion/corrosion monitoring program. The program considers Generic Letter 89-08. The EPRI NSAC-202L-R3 guidance, industry operating experience, and we will use CHECKWORKS as the analytical tool to address that.

We have another COL item, 10.2.1, and notice these are standard. They are the same across all the COLs, dealing with a turbine maintenance and inspection program. We, in this regard, have proposed a license condition to provide that program prior to fuel load. It has to be based on the actual as-built rotor, and so that is why it is provided later on.

We also have a COL item, 10.4.2, dealing with condensate feedwater auxiliary steam system chemistry control. We describe the approach that we

are taking, the program that we are putting in place. Essentially, we are adopting the NEI-97-06 steam generator program guidelines and the EPRI PWR secondary water chemistry guidelines.

We also have a COL item to address the potable water system. In the case of Bellefonte, we are using the Scottsboro Municipal Water Supply, and we describe that.

Other issues that we have addressed through supplements to Chapter 10:

We have talked about the turbine missile generation for dual units. In Chapter 10, we really just have a pointer to Section 3.5.1.3, where we address that analysis.

CHAIR RAY: What is that section?

MR. SPINK: 3.5.1.3.

CHAIR RAY: Which is?

MR. SPINK: It's basically a turbine general missile.

CHAIR RAY: What's Chapter 3?

MR. GRANT: 3.5, in general, is external

hazards.

CHAIR RAY: Okay.

MR. GRANT: And turbine missiles are one of those external hazards.

CHAIR RAY: All right. Thank you. I don't have it memorized, but I like to understand why it is over there instead of here.

MR. SPINK: It is where all those are evaluated.

CHAIR RAY: Yes, all right.

MR. SPINK: We also provide a description of testing operation and maintenance procedures. These procedures are designed from an O&M standpoint to mitigate potential degradation mechanisms for pitting, stress corrosion and cracking, corrosion fatigue, and erosion corrosion in the turbine.

Also, we have provided a standard supplement on the inspection program, to provide assurance that rotor flaws are detected, and it incorporates the ISI schedule requirements, per ASME Section 11.

In the main steam system, in 10.3, we provide standard supplements to address operations and maintenance procedure. Now earlier, in Section 1.8, we talked about interface requirements. This is an interface requirement where we are providing these procedures to address prevention of water hammer. So it is an interface with the system design that the applicant has to meet. So that is an example of where we have an interface requirement with the standard design and an operational program complementing the design.

We also describe the chemical addition program. It is how we are going to control the main steam chemistry. Primarily, we are providing an alkaline chemistry that supports maintaining iodine in a non-volatile form.

I think this may be our first exposure to CDI. The DCD addresses a circulating water system design in a very generic fashion with brackets for site-specific. Obviously, every site has different cooling water sources. In the case of Bellefonte, we

are utilizing the existing cooling towers on the site and the existing intake channel. So we filled in those brackets to provide the details of the design for our circulating water system.

We have also provided operating and maintenance procedures program to address those systems. Again, it is an interface requirement that minimizes the potential for water hammer.

And we also address the chemical additional program for the circulating water system. We have a water treatment skid out by the cooling towers to provide that chemistry control.

Finally, we have one open item that addresses a flow-accelerated corrosion program implementation schedule. We submitted last week on the Vogtle docket a submittal to address that open item, where we are proposing a licensing condition to identify the schedule for the implementation of that flow-accelerated corrosion program.

CHAIR RAY: Okay. Back on 10.2, I'm still mulling over where I would look for the delta

risk associated with the longer intervals in valve testing on the turbine valves. I would gather that I would go to this section in 3.5 where the missile generation data appears, and I understand that it is DCD assumes lower units or unfavorable orientation, if I understood what Rob said correctly.

MR. SISK: I'm sorry?

CHAIR RAY: I said, if I understood what you said correctly, the missile generation assumes unfavorable.

MR. SISK: It assumes unfavorable. It is a single unit, but it assumes unfavorable.

CHAIR RAY: So there is nothing that TVA would have to do because they're not worse than unfavorable?

MR. SISK: Right.

CHAIR RAY: And it also has the three-month to six-month -- or it has the six-month testing assumption in it.

MR. SPINK: We have incorporated that by reference.

CHAIR RAY: Yes. Do you guys have any input to that at all? In other words, I realize you can test it more often if you wish. So I would assume you would say, well, that's just fine with us.

MR. SPINK: In the Design Center Working Group, we have an engineering team that works hand in hand with Westinghouse, looking at all their changes and aspects of the design and interface with the operation. So we work together with Westinghouse to come up with a solution that we're all happy with, and it also helps us achieve standardization across the board.

So, as I noted, these standard supplements on maintenance and operating procedures are all standard. We are working very, very hard together to make sure that all of us are doing the same things in the same manner.

CHAIR RAY: Okay, thank you.

Anything else?

(No response.)

All right, to the staff.

MR. REDDY: Yes, my name is Devender Reddy.

I believe that most of the chapter 10 sections of the --

MR. BUCKBERG: My name is Perry Buckberg. To my left is Devender Reddy, one of the staff members, who will talk shortly.

I begin the Chapter 10 presentation of the staff's AP1000 DCA review.

Joining me, to present the Bellefonte COL portion, is Sujata Goetz, the PM, and technical staff members are, to my left again, Devender, Greg Makar, and Ken Mott. You will hear from them shortly.

Chapter 10 of the SER includes evaluations of most Revision 17 changes. There is one exception to that, one small section where it's only as far as 16.

Review of the four Chapter 10 sections resulted in five DCA open items and one COL open item, as listed.

The changes the staff considers

significant are listed by section again. Highlighted changes will be presented in the following slides, but the staff is prepared to discuss any questions you may have of changes evaluated in the SER.

And let me turn it over to Devender for the first technical slide.

MR. REDDY: All right. We already talked a bit about the overspeed protection system, and we are going to add some other to clear up or to respond in full and complete to what you have questions.

Just to give you some background about this, the NRC staff evaluation of AP1000 DCD, Revision 15, is in NUREG-1793. That is the Final Safety Evaluation Report for AP1000 standard design.

And in Revision 17, what we call 17, of the DCD, it still was proposed a new standard design for the turbine generation system for Design Certification.

And the item from the previous design was Rev 15, and the changes, the staff looked at those changes and evaluated only those changes. That means

we evaluated -- in the evaluation, we look at the changes in Rev 16 and 17.

And there two major areas that we reviewed. One is the turbine overspeed control system, and the other one is the turbine broader design issues. I'm going to talk, myself and Kenneth Mott, we are going to talk about the overspeed controls and -- he will present to you the turbine broader design.

CHAIR RAY: Devender, I didn't understand you to say that you just looked at the differences between 16 and 17, did I?

MS. McKENNA: Between 15 and 17.

MR. REDDY: Well, actually, there are modifications, changes of Rev 16 and 17, but right now I think I heard you earlier say that --

CHAIR RAY: So I just wanted to verify the difference between 15 and 16 -- 17.

(Laughter.)

If there's no difference between 15 and 16, or no difference between 16 and 17, I don't care.

I just want the difference between 15 and 17.

MR. REDDY: I appreciate that, and, actually, yes, those were the changes we focused on are in Revision 17 which are different from 15.

CHAIR RAY: Correct.

MR. REDDY: And there are two major areas for us in terms of Section 10.2, for the turbine system. One is the overspeed control. The other one is the rotor issues.

Ken and I, we are going to talk about overspeed control and what we did, how we evaluated, how we wrote the SER. That is what we are going to talk about.

Regarding the turbine control system, the staff based its evaluation on the regulatory criteria, such as General Design Criteria, GDC-4. GDC-4 requires that, for the protection of structures, systems, and components that are important to safety, and the effects of the turbine missiles, the turbines, the Reactor Protection System should provide suitable redundancy, and diverse

devices. That's what we are talking about.

It does have to minimize the probability of the turbine missiles. Also, the staff, what we do is we look at the SRP guidance. The SRP guidance provides no details on how these diverse and redundancy requirements are met.

The SRP 10.2 section, it identified -- actually, it recommended that there should be a mechanical device to protect the turbines overspeed from reaching 111%, and also there should be a redundant and diverse electrical overspeed control device. So these are the two we have been looking at; this is what we have been discussing.

So in the process of actually evaluating whether or not the applicant provided in Revision 17, we looked at the GDC-4 criteria and then we looked at the SRP Section 10.2 for details, and we have been issuing RAIs to the plant, just like what you have been asking, and then we were provided the responses. We evaluated. We went back and forth. Finally, we concluded that the system is acceptable, pending one

open item. That is what we discussed with ITAAC.

At this point, I would like to turn to Ken to discuss a little bit ITAAC.

MR. MOTT: Yes. As already stated, the guidance of 10.2 is that, from the staff and the SRP, is that one of the overprotection trips will be mechanical and one of the overprotection trips will be electrical, and the entire analysis for diversity between the two systems is removed from the staff in that section, if you follow the guidance of the SRP.

A problem with the SRP is that it does not point you to or provide any guidance for making an analysis for sufficiency of diversity. So what documents do we bring in to look at this that are appropriate and meet the guidance for the regulatory criterion of what we are looking at?

However, the ITAAC, I definitely wanted that there, and it was an ITAAC requirement because, like I say, upon the visual inspection of the mechanical system and the computer box cabinet, you can inherently see as diverse, but once you are

sitting there looking at two computer cabinets, at two computer boxes, two laptops, whatever you want to look at it, there's no way to confirm the components, modules, chips, processors, buses inside, to ensure that one cannot be failed by the other, by the same common-cause failure.

So the ITAAC would be the visual inspection that would exist if you had a mechanical system and an electrical system. So the ITAAC now, because once you have a cabinet or a box filled with electrical components, you are not going to rip it open to make sure that one of the computer chips says Intel and the other chip says AMD. So only a report will have to exist to ensure sufficiency of a diversity.

So we have several RAIs. One of the RAIs was submitted and it wasn't sufficient, and they made it a revision, an update to the RAI. However, their proposed markups at this point of review were not sufficient. A lot of description in the RAI should be placed into the FSAR. To your point, you're

reading, and if you've got holes and gaps in your analysis, and that is where we are sitting at now, what is the appropriate level of diversity and sufficiency for the two electrical overspeed trips? Obviously, it is not going to be the same as a primary protection system and an I&C system. Is it at some level reduced, that we would provide only DAS, diversity actuated system, since it is an non-safety system that we are going to bring to this? What is the sufficiency of the level of the ITAAC?

Mr. Chairman, you are exactly correct. As it looks right now, this doesn't look like a DAC. But what we approved in the Revision 15, we approved a mechanical system and we approved an electrical system with no indication of anything, what the electrical system would consist of, of anything, but simply because it was diverse here.

Now we are saying two an electrical systems --

CHAIR RAY: I understand. Okay. Well, this is a little odd, as you say. It presents a

challenge.

I suppose one could have said, well, just this is just a DAC; we'll solve it before fuel load. But I realize there's an open item in here asking for a date by when this will be resolved, right?

MR. MOTT: That is not correct.

CHAIR RAY: What is --

MR. MOTT: We don't request a date. We are looking for sufficiency and diversity, that is requested and required of them, and comparison from Rev 15 to Rev 17. Hopefully, we are going to go back as well. Westinghouse has stated that in August they will have another vendor selected. So, therefore, if they have a vendor selected and they have the design ready for us to review, then there will be no use to having a DAC item included.

CHAIR RAY: Right, but I did think there was a request for a date in here. Westinghouse is to provide a date for the completed design. Staff identified this as open item SRP-10-22, umpty-scotch.

All right, now we're separating single

failure from diversity. Okay. Now, for a simple person like me, single failure and diversity, I don't parse it that finely.

So there is an open item here on the date for whatever the hell it is talking about.

MR. MOTT: You're correct.

CHAIR RAY: Okay.

MR. REDDY: Normally, we don't ask for, we don't put any date in that, actually, but, yes --

CHAIR RAY: Well, I know, and that's what I found very confusing by this whole thing, is that it just seemed to say this is all fine, but please give us a date when you will be done. But I couldn't tell from that anything more, like, well, when is it going to be done, and are we going to be able to look at it, or do you just go out there and inspect it, and tell them they can load fuel, or what? So that is what I think I'm getting a better understanding of here.

Okay, we should proceed.

MR. REDDY: I think he is done, actually,

other than the open item on the turbine control system.

MEMBER BROWN: I do have one question on the belts. There's something I didn't understand in their discussion.

When you said you eliminated the 110 percent trip, this is discussed in the SAR on page 10-8. You ask them to describe why it was a justification for eliminating the 103 percent, the overspeed trip. And they answered that the valves were not designed to close at 103, but they would close at 105 or 107 percent.

I'm not a valve guy, but it just seems to me, if a valve would close at 105 or 107 percent, it would close at 103. Now I don't know what the basis for the statement was. That is the answer they gave you all. That is the answer to your RAI SRP 10.2. That is BPA-03.

So I didn't know if that was relevant. I just bring that up. I don't know if it is relevant to anything that is in here other than the control

issue.

CHAIR RAY: What did they say, also, was that the described condition was for the speed control mode of the turbine --

MEMBER BROWN: Yes, but they said it wouldn't close.

CHAIR RAY: Well, actually, they said -- did I read it wrong? Well, it just said, because the Toshiba turbine valves and hydraulic system are not designed to close at 103 percent, instead it is 105 percent.

I read it as saying this is a control function --

MEMBER BROWN: Okay.

CHAIR RAY: -- rather than a trip function.

MEMBER BROWN: Oh, all right, that's fine. That's fine. I missed that very fine distinction. I told you I wasn't a valve guy. Okay?

There's no problem of eliminating; I just didn't understand the issue on the valves.

MR. REDDY: The staff, you know, we felt that was their design.

MEMBER BROWN: Okay, that's fine.

MR. REDDY: It is an engineering judgment.

MEMBER BROWN: I'm happy now.

MR. REDDY: All right.

CHAIR RAY: All right.

MR. REDDY: That, actually, if you don't have anything on the turbine controls, we are done with that open item. We have been discussing, and now Greg Makar will be talking about further issues.

MR. MAKAR: I am Greg Makar from the Division of Engineering, Component Integrity Performance and Testing.

MS. GOETZ: Excuse me. Yes, I think I'm up.

MR. MAKAR: I want to address some topics on the turbine rotor integrity. These are going to be changes going from -- that are in Rev 17 compared to the Certified Design in 15. In particular, there

was, as we discussed, the change to a different turbine type and also change in the valve test interval.

I think it is also worth pointing out that some of the key parameters in our turbine rotor integrity considerations did not change, such as the materials selection and the fracture toughness requirements.

Other changes are related to the maintenance and inspection program, and including the time when that would be submitted to us. To support these changes, we reviewed material provided to support these changes, which includes a report on valve test frequency and on the missile probability report.

These reports are done. The methodology used was the same as in the Certified Design. In other words, for example, in the missile probability analysis, they are looking at the same types of failure mechanisms.

Now I apologize. This slide does not say

what we mean, which is in the first part of the evaluation, which is the bounding analyses together with the operational experience and the fact that we need -- and you will see this turbine maintenance and inspection program that gives us confidence that they can meet the GDC-4 requirements.

The delay or the change in the time when we see the maintenance and inspection program, which is now prior to fuel load, is acceptable because, as important as these bounding analyses are, really the key is the maintenance and inspection program that is based on the as-built rotors, so when they look at the material properties of the real machine as built. So, therefore, changing the time when that is due; it is before fuel load, and that is acceptable for us.

There were open items related to each of those two parts, the valve test frequency and the turbine missile analysis. One is the valve test frequency report. When we looked at those numbers, there was an error in the part that justified the

six-month valve test frequency, and it turned out to be just a typo. But it was a significant typo, and that is why it rose to the level of an open item, because if the number as printed was correct, it would not have supported the six-month frequency.

The open item on the turbine missiles is -- you've heard there's Chapter 3 involved, there's Chapter 10 involved; there's favorable, unfavorable; there's low trajectory, high trajectory. For the DCD, after reviewing the turbine missile analysis, at some point it became unclear whether this addressed both low trajectory missiles and high trajectory missiles for favorable and unfavorable orientations. That was the nature of this open item, which is still open.

The second open item would be we received a new copy of that valve test report. But that first item is still open, and we need to interact still with the applicant to determine how they plan to address that.

CHAIR RAY: Okay. Thank you.

Anything else?

Any questions at all on the DCD side?

(No response.)

MR. BUCKBERG: We will turn to Sujata Goetz for the COL side presentation.

MS. GOETZ: Yes. I'm Sujata Goetz. I'm the Project Manager for the Bellefonte COL Chapter 10.

This slide shows the summary of departures and supplements for Chapter 10. We are going to be speaking on the highlighted sections, but, of course, we can talk about anything that you are interested in.

With that, I will turn it over to Greg, who will talk about flow-acceleration corrosion.

MR. MAKAR: Yes. The first topic I would like to address for Bellefonte is the flow-accelerated corrosion program because it is a COL item, and also there is an open item related to it.

The applicant's proposed program is standard COL information. So this is something that

will be followed by other applicants.

Our review focuses on whether their flow-accelerated corrosion program -- I will say sometimes flow-accelerated erosion and corrosion are used interchangeably. They are not the same, but when you see in this presentation you see erosion/corrosion, flow-accelerated corrosion we're talking about the same thing.

We are looking at if their program addresses the concerns in Generic Letter 8908, which has to do with a monitoring program, the design, and considering operating experience for steel pipes containing water or water/steam mixtures.

The current industry -- and this is met by the operating plants with the guidelines of EPRI called NSAC 202L, and this program, it describes in general what is required for an effective program. It also gets into details on things like design and how to perform susceptibility analyses and how to analyze inspection.

The program submitted by the applicant

does use the EPRI guidance, and they have some additional description of that program in the FSAR. And we will also be using for their analysis tool, their computer-based analysis tool the CHECKWORKS program, which also comes from EPRI and is used by, I believe, all of the operating plants now. This has a predictive capability as well as an analysis capability for inspection data.

I also want to point out that the first line of defense against flow-accelerated corrosion is the plant design. So that focuses on materials, the layout, piping, the components, water chemistry, and some other things.

But this program will be very important if, as the applicant said, they will do an analysis and they may find that something was changed, something may still be susceptible. So the intent is not to have a lot of things that require a lot of inspection for flow-accelerated corrosion, but recognizing that that may happen, this program will be put in place.

The open item is related to the timing of that, what is going to be done during the construction phase and when the program will be in place. They have provided an acceptable RAI response, but we have asked for that to be in the application.

CHAIR RAY: Okay. I did note that.

MR. MAKAR: The next topic for Bellefonte is their maintenance and inspection program.

MEMBER BANERJEE: Are there materials being used extensively here that are not used in the current generation of LWRs?

MR. MAKAR: The steam and feedwater system it uses primarily, and the piping where that is a concern is primarily done in chromium-containing steels. That should not have, you may recall, I think it's an 1.5 percent chromium will reduce the corrosion rate by 65 times, or something, compared to steel. So it is done primarily with corrosion-resistant -- and that is DCD. That is design increment.

Their maintenance and inspection program, this is a COL item again. So it is required to be provided by the COL applicant.

It is going to be addressed, as I said, prior to fuel load. In this case, the applicant has a license condition. When that maintenance and inspection program is available, as I described earlier with the DCD, based on the as-built turbine and then we would be looking at whether it is still consistent with the more detailed description that is already in the DCD. That is the more important. DCD provides a plan for how that will be inspected and maintained.

The real one that we will be receiving for review comes later on after the turbine has been built.

CHAIR RAY: Understood. Okay.

MR. MAKAR: And with that, I will turn it back over to Devender to discuss the circulating water system.

MR. REDDY: All right. We are going to

speak to the circulating water system. As previously said earlier, in the AP1000 DCD, portions of the system are identified as conceptual design information. That is a CDI. That is what we call it.

Also, there is one similar information item regarding the water quality of the maintenance of the chemical balance, maintaining the water quality, and also a COL information item, design data for the circulating water system.

The NRC staff, we reviewed the development application only is limited the CDI and the COL information item.

Regarding the CDI, TVA provided the plant-specific design, including the component description, instrumentation, rod protection, and the chemical injection.

To give more details, some brief details, the system has about three equal-capacity pumps and one type of natural turbine cooling tower and piping and valves. And the cooling tower is the heat sink

for the system, for the BOP system.

And the staff evaluated the circ water system. As I said, it is limited for the specific information provided in the application, but the staff's evaluation is based on Commission regulation, which in this case is GDC-4 again. But, in this case, the GDC-4 requirements are stipulated to be SRP Section 10.4.5.

The focus of the staff evaluation with regard to circ water system is about the flood water, for flood prediction. There could be a failure of the cooling tower or maybe pipe failure in the system, and that could flood and effect safety-related equipment or systems and/or components.

From that point of view, the application by NRC staff -- we delivered the staff what they provided, and we found that the cooling tower is located over 2,400 feet away from the plant. Also, the site grading, we looked at the site grading. So, if there is a failure of the cooling tower, first of all, the water will flow away from the plant. The

second thing is there are no safety-related components that below grade.

Also, we looked at the freeze-protection part of it. Bellefonte, they have -- what do you call it? It is a turbine building. I think there is a system which bypasses the circ water system also. So in case to protect from the freezing, to protect the system from freezing, it can bypass. There is a cooling tower bypass system, I think they have in their design.

So, based on the design features and also on the GDC-4 requirement and the SRP guidance, we concluded that the system is safe and it meets the requirements. Also, it is consistent with the DCD. The system is consistent with the DCD.

CHAIR RAY: Where does the blowdown go to?

MR. REDDY: Pardon me?

CHAIR RAY: Where does the blowdown go to from the cooling tower?

MR. SPINK: The blowdown goes out to the

river.

CHAIR RAY: So it goes to the river? The blowdown discharges to the river. Okay.

MR. REDDY: And they have a make-up water system for the operation --

CHAIR RAY: Yes, yes.

MR. REDDY: Also, we believe the article is a COL action item, information item, with regard to the water chemistry, and we found that is acceptable and it is consistent with the DCD.

CHAIR RAY: So, if you have a steam generator tube leak and a condenser leak, you've got monitoring on a blowdown, I assume?

MR. SPINK: Yes.

CHAIR RAY: You don't have an unmonitored release path? Okay.

Anything else on Chapter 10?

MEMBER ABDEL-KHALIK: I have a question. A seven-stage feedwater heater was added.

MR. REDDY: Right.

MEMBER ABDEL-KHALIK: Now what other

parts of the DCD have been touched by that one change? And how did you convince yourself that the applicant has addressed all those potential impacts?

MR. REDDY: Can you elaborate on the question, please? I know they added a seven-stage feedwater heater. I thought that this is for the turbine cycle efficiency.

MEMBER ABDEL-KHALIK: But that may have impacts on many other parts of the DCD. The question is, what other parts of the DCD may potentially be impacted by that change, and how did you convince yourself that the applicant has addressed all those potential impacts?

MS. McKENNA: Let me give it a try first. I think, from the applicant point of view, and Rob can speak to this, I mean it is their responsibility to identify if it is a result of the change to the seven-stage heater; there's a change in Chapter 3 or there's a change in Chapter 14 on test program, or something else that needs to be revised. So we would first look to them to look for those conforming

changes and point to them.

Then, I think from the staff point of view, depending on the nature of the change and what we think it might affect, that's when it would kind of trigger our thought process by saying, well, if you're changing the heaters, is that going to change the feedwater flows or temperature? Kind of trace that through. That is, I think, the thought process the staff would go through in terms of whether there is need to probe beyond what changes were identified as being specifically addressed by that change generally.

Jim, did you want to add anything to that?

MR. TATUM: Yes, Jim Tatum, from the Balance of Plant Branch.

Basically, we focus our review on any safety-type considerations that the change may impact. While the change or the addition of the additional feedwater heater will affect efficiencies, and whatnot, in a secondary plant operation, it

really doesn't impact much with respect to safety.

The other thing we look at is the applicant's evaluation of that change and whether they determine if it requires NRC review and approval. Typically, when we look at the departure reports, and whatnot, these sorts of changes do not. It is a 5059 process. They do not require NRC review and approval, and we consider, based on our knowledge of the systems and what we would expect the impact to be, whether we would agree with that evaluation or whether we would think that there may be change, and then we would pursue it.

In this case, we did not see a need to pursue the change. It appeared to us that it really did not require an NRC review and approval, and it would not affect a safety consideration from our SRP evaluations.

MEMBER ABDEL-KHALIK: So if this, I assume, was primarily added to increase secondary site efficiency, I assume it had an impact on feedwater temperature. Was that change in feedwater

temperature carried out throughout the process to figure out what the impact of that will be?

MR. SISK: Let me answer the question on one part, and then I can turn it over to Ed or to Keith to get into more detail.

I kind of want to start where Eileen was. Changes that come through, we have a change control process where we do take a look at the impact of that change, not just change out the turbine, but whether it is PRA safety, impacts on cooling, you know, water. So there is a complete process within the system where we identify that.

MEMBER ABDEL-KHALIK: I understand.

MR. SISK: Now are you asking with regard to that one specific change?

MEMBER ABDEL-KHALIK: Right. Just to test your process.

MR. SISK: And, Keith, are you on-line? Keith?

MR. SCHWAB: One thing, when we went from six stages of feedwater heating to seven stages, in

the previous design with the other turbine vendor, the six-stage feedwater heater was very, very large. We ended up maintaining the same final feedwater temperature when we took the six-stage and broke it into two stages of heating. We did gain some efficiency, but we did not, to my recollection, change the final feedwater temperature. So flow and temperature of feedwater was the same with both arrangements.

MEMBER ABDEL-KHALIK: I guess I picked a bad example.

(Laughter.)

MR. SISK: But, from a process viewpoint, it is a very important aspect.

MS. McKENNA: It is a good process question, though, yes.

MR. SCHWAB: Well, the process is important because when we make a change, you know, we evaluate that change from all disciplines, so that each one of those disciplines, if potentially impacted, looks at whether or not that change has an

impact on their portion of the DCD, so that it gets a broad, disciplined review, and the whole change process is very well-controlled and configured.

MR. SISK: And just to wrap that comment up, as we do that, exactly as Eileen indicates, we try to -- I would like to say 100 percent, but never 100 percent -- capture all those changes' impacts on the DCD and let the staff know where those impacts are, so they can evaluate and either concur or identify whether we have been thorough in our evaluations.

MR. REDDY: Yes, I would like to say, actually, that is a very interesting question you ask, but I think with those changes, whether they have been made to the prevent cycle, first, they are to go to the heat balance. I think if it impacting the heat balance or the heat rates, and all that, we would catch it at that point.

But as far as the NRC is concerned, like Gene said, we don't look only from a safety point of view and the non-safety system.

I may not have not the right answer, but actually what Gene said is we did look into those things. I think they have answered that part of it.

CHAIR RAY: All right. Thank you.

MR. CUMMINS: So just another comment. This is Ed Cummins.

We evaluate in a safety analysis loss of feedwater heaters. They act like cold-water events. Usually, we look at all of them, and then we find some bounding one, and we do all the analysis for the bounding one.

I don't know what happened in this case, but I suspect that we said, generally, the more you have, the less impact any one has. And the bounding one still was bounding and we were okay.

But the thought process is what you go through; you can affect the primary with the secondary, and if you lose feedwater heaters, it is equivalent to changing the temperature down. So you get reactivity insertion.

CHAIR RAY: Okay. Anything else on

Chapter 10?

MEMBER BANERJEE: I thought that shock you had in the beginning, that there were three or four yellow things, I had a question about the item preceding the control steam hammer.

That is standard. Is that different from what it was in the original design, right?

MR. SPINK: It is an operational program as opposed to a design feature. So, from an operational standpoint, we, as the applicant, respond to that.

MEMBER BANERJEE: I see. Okay.

MR. SPINK: So it is the operational procedures, things such as prevention of rapid valve motion, the process for avoiding introduction of voids into the water, et cetera, et cetera; those all go into the operating procedures to mitigate potential for water hammer.

MEMBER BANERJEE: That is why you addressed it?

MR. SPINK: That is why we addressed it.

MEMBER BANERJEE: Okay.

MR. REDDY: Actually, we issued an RAI, and we are responsible for all of that information.

MEMBER BANERJEE: Are there any particular problems with water hammer here compared to other plants?

MR. REDDY: Let me take this one. This is a question we looked at for every project, every plant. So we have to review the DCDs and COL applications. We always look for that information. But basic analysis for the procedures.

MEMBER BANERJEE: But is there something for this design which is particular compared to, say, a current LWR?

MR. REDDY: I don't think so.

MEMBER BANERJEE: There is nothing there?

MEMBER ABDEL-KHALIK: Back to the question I asked earlier about the design change process and how it impacts other parts of the system, I understand that you have a formal process by which the owners of different parts of the system evaluate

whether or not that particular change would have any impact on their part of the system.

The question is, from your response, the staff's response, it seems like your process is far more ad hoc. Do you have a formal process by which you actually evaluate and/or determine whether or not the applicant's conclusions with regard to the impact of that particular design change is limited to whatever they have identified?

MS. McKENNA: I don't know that this is any different than it is in an operating plant environment, where if they come in for whatever kind of change in their FSAR or their tech specs, that the staff would have to consider whether all of the applicable things that might be affected by whatever scope of change is being asked for. Again, I think the answer does take you back to the standard review plans, which guide us in terms of, well, what are the things, the standard review plan, the different sections in terms of, what are the systems that are covered by those standard review plans? Could they

have been changed by whatever this change was? I think there's sometimes lead and secondary branches that talk to each other in terms of, well, here's this, like you saw with the vendor and Ken where there is an issue on the turbine side, but involves the electrical controls. So they kind of come together to see how those issues work together.

So I think that it is embedded in our overall review process. I don't know as there's a formal mechanism that says how we, beyond the kind of stuff I'm describing -- you know, if anybody else wants to come rescue me --

(Laughter.)

MR. CUMMINS: Well, I have a comment. Ed Cummins again.

When the NRC comes and audits us, I think the No. 1 primary audit topic was change control. So lots of review of our process and our procedures and how many open items we have, and the consequences of the change control process were commented on and reviewed. So at least they inspect into us this is a

requirement or we do this ourselves, but they are certainly verifying that we are doing it ourselves.

MEMBER ABDEL-KHALIK: Well, I understand that, yes. If you have a process, you can check what your process is.

MR. CUMMINS: Right.

MEMBER ABDEL-KHALIK: But the question is, how adequate is the process? How corrupt is the outcome of your process?

MR. CUMMINS: That is part of the audit. I mean we have measures. You know, there's nothing that is foolproof, but there's all kinds of measures on how the process proceeds and there's audits you can do -- in fact, they did do -- to see if the design change got into the technical documents. So they take a random technical document and they are trying to find where that change got into the technical document, and if it didn't, that's a deficiency.

We have a tracking mechanism that says here's some changes we haven't implemented into the

technical document yet. So we are okay if it is on our to-do list. We are not okay if we lost it in our process. So those kinds of things were looked at to a considerable degree.

CHAIR RAY: Anything else on Chapter 10?

MR. TATUM: If I could, before you move on, on your question -- Jim Tatum again, Balance of Plant Branch.

Our typical review process, first of all, before you get to the change, the application comes in and we are reviewing the application. Well, the review is compartmentalized in a way in that it is really managed by the SRP.

Now each technical area is reviewed by different experts and staff, but we quite often find that a particular design element that is in one review area may be not addressed adequately for some other area. So we work together as a staff, and our discipline, I guess if you will, is to make sure that we do our review, but we also identify anything in that section that may have some impact or may be

likely to fall through the cracks and not be reviewed by someone else, that we point that out.

What you see here with the vendor and the I&C staff, that was something where we recognized that there was something that someone else had to be involved, and we initiated that process.

Now, when you follow on to a change, it is quite the same sort of concept. We get a change in, but it is just like if you got the application in from the beginning. I mean we are looking at a design, albeit a change, but our discipline is we look at that change, and if we think that there is something that needs to be reviewed by someone else, just like we would in the original application, we flag that for them and we make sure that, well, because we are not the experts in all facets of the change, we have to get the electrical, the I&C, maybe materials people involved. It is up to the staff to recognize when they have to do and what their specific area of expertise limitations are.

So that is kind of how we manage that

process.

MEMBER ABDEL-KHALIK: But that is the heart of my concern. The process is ad hoc.

MR. TATUM: Well, that is all review. I mean, if you look at just the review that we do, it is managed by the SRP. It is the same way with the changes. We do the change in a review in accordance with the SRP, and it is up to the staff engineering, and we have pretty knowledgeable staff, to know when the change involves other disciplines. We engage those other disciplines when we recognize the need to do that.

MEMBER ABDEL-KHALIK: Thank you.

CHAIR RAY: Okay. Well, I think I don't want to belabor this any further, but it is a fact that when you are dealing with a virtual plant as opposed to a real plant, the process that you follow for a real plant to review a change may not be adequate to a virtual plant, particularly when there are so many changes going on and when there's so many things that are still not fully resolved the first

time through. When you come through time after time after time, the possibility of some oversight I think is what Said is concerned about because we don't have any way of -- we don't have a real plant. We just keep making changes to a virtual plant.

Well, that being said, we are just an hour from our scheduled end of the day. We've got two chapters to go, Chapter 11 and 12.

I mentioned, and I will mention again, that Dr. Mark Ryan is a member of the Subcommittee, not here today, but with special expertise in the areas of radioactive waste management. He will be looking at this material as well, but just not have the benefit of our meeting here today. Those of us who are here will have to persuade him that everything is okay.

(Laughter.)

So, anyway, with that being said, let's press on with Chapter 11.

MR. SISK: I want to introduce Tom Ray to lead us through Chapter 11.

CHAIR RAY: Do you realize there are three Rays in the room? That is a very seminal event.

(Laughter.)

All right, let's have order here.

Who is going to start?

MR. TOM RAY: I am going to start for Westinghouse.

CHAIR RAY: All right.

MR. TOM RAY: If you are ready, I will introduce myself again. My name is Tom Ray. I am AP1000 Licensing Engineer for Chapter 11.

Can we go to the next slide?

Just to give you an overview of Chapter 11, Chapter 11 is the radioactive waste management system. Parts of that chapter are source terms: the liquid waste system, gaseous waste system, solid waste, and your radiation monitoring.

Next slide, please.

We talk about the changes from DCD Rev 15 to DCD Rev 17, and talk about the major changes.

The first one, of course, is the increase in the overall liquid waste total capacity and the improved operational flexibility. We added three additional liquid waste monitoring tanks to the design. These tanks are identical to the three that were in the original DCD Rev 15 design. In the auxiliary building, we just added three more there now, and also in the rad waste building.

CHAIR RAY: Does the DCD assume zero release or what?

MR. TOM RAY: Tim? The question was --

MR. MENEELEY: The DCD does not assume release.

CHAIR RAY: So you have a monitored release assumed?

MR. MENEELEY: That's correct.

MR. TOM RAY: The next change was clarified compliance with 10 CFR 20.1406. Basically, 10 CFR 20.1406 requires that you design and your design will minimize contamination and generation of waste throughout the process and, in the end,

actually, back-driven, to make sure when you decommission, you lower that amount of waste generation. So we have clarified that compliance in DCD Rev 17.

The next part is we updated some DCD section for closure of COL items related to identification of unexchanged absorbent material, dilution and control of boric acid discharge, and identification of absorbent material.

The changes primarily take it from a requirement to actually include the material into more of an operational standpoint, so that it is known that the media may change the operation of the plant.

In our next bullet, we talked about, we clarified our compliance with Reg Guide 1.43 and 10 CFR 71. There were some concerns with putting the new radwaste tanks into the radwaste building, that they may be higher levels -- it's alpha 1, alpha 2 for 10 CFR 71. Basically, we clarified that, no, the materials in those radwaste tanks are lower than

those levels, so committed to have them in a non-seismic building, the radwaste building.

And the last one was there were some inconsistencies in DCD Rev 15 with our compliance with 10 CFR 50, Appendix India, and 10 CFR 20.1401. There were times when we referenced one and left out the other one. So, basically, through RAIs, we went through and cleaned up those inconsistencies.

The next slide, please.

CHAIR RAY: Okay, so you don't list as a major item, then, this reduction in the charcoal bed hold-up time?

MR. TOM RAY: No, that was considered a minor design change that we went through.

Tim, if you can talk a little bit to the reduction in charcoal --

MR. MENEELEY: The change in the charcoal bed was a change of the assumed absorption coefficient, not of the bed volume. The bed volumes remained the same.

When we searched the literature, we found

there were conflicting values for the absorption coefficient, and we had used the most conservative value that we found for our calculations, but we had listed other values in the DCD. We decided which of them were less conservative than what we did our calculations. So we took out the less conservative values in order to only publish the most conservative case.

CHAIR RAY: Thank you.

MR. TOM RAY: And the one open item for Chapter 11 is needed more information and evaluation, a consequent evaluation of gaseous system leak or failure, and we are working with the staff to resolve that open item.

And that is it for --

CHAIR RAY: Say some more about the last open item.

MR. TOM RAY: Basically, the evaluation was not there for the AP1000 for annual airborne releases listed in table 11-33. So we've actually completed that evaluation now and just working with

the staff to get that put into the DCD.

Tim?

CONSULTANT KRESS: That is not a control room issue, is it?

MR. TOM RAY: That question, Tim, you could talk a little bit more to that, and the question was if it was a control room issue.

CONSULTANT KRESS: No, it is just a release to the environment?

MR. MENEELEY: I apologize for not introducing myself before. I'm Tim Meneeley from Westinghouse.

No, this not a controlled release. This is the case of, if a system ruptures following a seismic event, something like that.

CHAIR RAY: But the question was, does the affect the control room habitability?

MR. MENEELEY: Oh, I beg your pardon. No. No, and, in fact, the conclusion of the evaluation was to use the most limiting, that is, the most conservative design for the delay beds. So we

have the best delay beds that would be required by Reg Guide 1143 in the design. But, no, it does not affect control room habitability.

CHAIR RAY: Okay. Anything else?

MR. TOM RAY: No.

CHAIR RAY: All right. Sanders?

MR. LEE: One question. Back on slide 17, you say you have three additional liquid waste monitor tanks. What does that mean in terms of capacity? Have you doubled your capacity or increased it by 10 percent? What does that mean?

MR. MENEELEY: I am Tim Meneeley from Westinghouse.

For the monitor tanks, we doubled the capacity. We went from three 15,000-gallon tanks to six 15,000-gallon tanks.

MR. LEE: Okay. Is there a corresponding analysis, consequence analysis, now to evaluate the impact of that additional capacity?

MR. MENEELEY: The monitor tanks were not -- do you mean for waste processing or --

MR. LEE: Is it appropriate? Is it appropriate to do a consequence analysis in case one of these tanks breaks or leaks?

MR. MENEELEY: Oh, we did a consequence analysis. That was the Part 71 analysis, was the content of radioactive material.

MR. LEE: Right. So there is analysis to correspond to the doubling of the capacity, I guess, is what is meant?

MR. MENEELEY: Yes. It really had to do with putting them into a new building. So it wasn't quite straightforward as doubling, but it covered that.

MR. SCHAFFER: This is Steve Schaffer from the NRC.

Part of the consequence analysis is to find the tank that has the greatest source term. So, once you go through the whole radwaste system and find the tank that has the greatest term and assume the release, it covers all the other releases.

MR. LEE: You've got it bounded?

MR. SCHAFFER: Yes.

MR. LEE: Okay, thank you.

MS. AUGHTMAN: Good afternoon. My name is Amy Aughtman, and I'm a Licensing Engineer with Southern Nuclear Operating Company. I will be presenting the COLA discussions for Chapter 11 and 12 today.

With me at the side table is William Smith, our Radiation Protection Consultant, and on the phone we should have Rick Ely, Jared Monroe, and Marvin Morris from Enercon Services.

We have the same organization and content, or structure rather, as the DCD does for Chapter 11. 11.1 is source terms; 11.2, liquid waste management systems; followed by 11.3 is the gaseous; 11.4, solid waste management, and 11.5, radiation monitoring.

I would like to point out that Section 11.1 is entirely incorporated by reference of the DCD. There is no additional supplemental information, nor were there any information items

that needed to be addressed.

MEMBER BROWN: So hold it. That means it is completely by reference? Is that what you just said?

MS. AUGHTMAN: Correct.

MEMBER BROWN: It's incorporated by reference? So the whole thing?

MS. AUGHTMAN: Yes.

CHAIR RAY: Source terms.

MEMBER BROWN: Source terms? Oh, okay, source terms. All right, thank you.

MS. AUGHTMAN: Section 11.1.

MEMBER BROWN: Yes, I had no idea what 11.1 means.

(Laughter.)

That's why I asked.

MS. AUGHTMAN: We had a few zero information items that we needed to address, and 11.2-1, we dispositioned as a standard information item. It has to do with the liquid radwaste processing by mobile equipment.

We provided the mobile equipment design features and ensured that -- or provided the commitment that they will be designed in accordance with Reg Guide 1.143; specifically, the codes and standards for those systems and structures that are listed in table 1 of that Reg Guide.

On 11.2-2 is the liquid cost/benefit analysis of population doses, and item 11.3-1 is the gaseous cost/benefit analysis of population doses. For both of those, those had a standard aspect to them as well as a site-specific aspect. The standard aspect is that we all used a similar methodology across the DCWG and the other utilities to address the cost/benefit analysis, but the site-specific aspect is that each site has their own specific inputs and results.

CONSULTANT KRESS: Is this an analysis that uses a thousand dollars per dose --

MS. AUGHTMAN: Yes, sir.

CONSULTANT KRESS: Which was a simple development from 1975?

MS. AUGHTMAN: The Reg Guide is dated 1976, but it is in 1975 dollars.

CONSULTANT KRESS: Both things are in '75 dollars. Your cost is in '75 dollars.

MS. AUGHTMAN: If I remember correctly --

MR. SMITH: Yes.

CONSULTANT KRESS: Do those things change together anytime or are they independent?

MS. AUGHTMAN: I'm not sure I --

MR. SMITH: My name is --

CONSULTANT KRESS: The cost of this stuff may change one way while the dose rems may go up for neighbors.

MS. AUGHTMAN: I will let William address that question.

MR. SMITH: My name is William Smith. I'm with Southern Nuclear Company, contractor.

Reg Guide 1.110 specified that you use 1975 dollars in your calculations related to that. So we followed the Reg Guide in the use of the dollars and the values for the other items within

that.

CONSULTANT KRESS: Did ACRS agree to this?

(Laughter.)

MEMBER BANERJEE: Were you on the ACRS in '75?

CONSULTANT KRESS: Yes.

(Laughter.)

MR. SMITH: It was a very good document, I might add.

(Laughter.)

CHAIR RAY: You de-escalate current prices back to '75 using some kind of --

MR. LEE: Wholesale Price Index.

CHAIR RAY: Well, no, not a Wholesale Price Index, but some applicable index for the material that you are talking about.

CONSULTANT KRESS: Two and a half percent?

CHAIR RAY: Huh?

CONSULTANT KRESS: Two and a half percent

yearly?

CHAIR RAY: No, it wouldn't be that. I'm just saying the way to do it is to take the current cost of the equipment back to '75 and see what it is in those dollars, using a de-escalator that is appropriate for whatever the hardware is. Okay.

MS. AUGHTMAN: Then the next item we addressed was 11.4-1 on the solid waste management system process control program. We provide a commitment to use an approved NEI template, 07-10-alpha, which is the process control program description, within our FSAR. So that NEI template does satisfy the requirement to provide a program description for the process control program.

The next item was 11.5-1, which is on the plant offsite dose calculation manual. Again, another NEI template which we are adopting, rather, and it has been reviewed and approved by the staff. That is also the way we fulfilled the requirement to provide the program description for the ODCM.

11.5-2 is effluent monitoring and

sampling. Again, this has a standard aspect to it as well as a site-specific aspect. The standard aspect is where we describe the program on items such as data collection and storage, daily checks of effluent monitoring, calibration of equipment. And the site-specific aspect addresses the fact that TVA is going to extend their existing Quality Assurance Program for Radiological Effluent and Environmental Monitoring, as based on Reg Guide 4.15, Revision 1. It is the program that will be used for Bellefonte Units 3 and 4.

Then the last information item is on 10 CFR 50, Appendix I. That is where we describe the estimated doses to both liquid and gaseous effluents. Those doses are actually provided in Sections 11.2.3.5 and 11.3.3.4 of the FSAR. Those both play into the cost/benefit analysis that we just discussed.

Okay. In addition to information items, we had some supplemental information. The items for Sections 11.2, .3, and .4 both deal with providing

quality control provisions for the codes and standards specified in Reg Guide 1.143, table 1 again.

The last supplemental information that we provided was in Section 11.4, where we describe procedures related to process control. Some examples for procedures, for items that we would be controlling through procedures, are shipping, disposal, and other maintenance activities.

And last, we have one open item in Chapter 11, and it is on low-level radwaste storage. The staff has requested that we address long-term storage capabilities, and we are in the process of resolving that item.

CONSULTANT KRESS: Is there a place now to send that stuff? They closed down Savannah River.

MS. AUGHTMAN: The Barnwell site, which is located in South Carolina.

CONSULTANT KRESS: I thought they closed that.

MS. AUGHTMAN: That is closed.

MR. LEE: It closed; it had Compact generators.

MS. AUGHTMAN: Right. There is one; I think it is the Atlantic Compact, that we still ship there.

CHAIR RAY: Thank you, Amy.

Any questions, more questions, for Amy?

(No response.)

Okay. Finally, I think, Serita, try again.

MS. SANDERS: I think you all know me now.

CHAIR RAY: One second. We've got to get your slides up.

It's all right. Go ahead. We've got it in front of us.

MS. SANDERS: Okay. I'm the Project Manager for Chapter 11 of the Design Certification Amendment.

I would like to take this opportunity to acknowledge the staff review of Chapter 11. For the

technical side, we have Steven Schaffer, who was our lead on the review, and other reviewers were Joshua Wilson, Douglas Dodson. I'm the Project Manager for the DCD, and Ravi is the Project Manager for the Bellefonte COL.

This slide illustrates the scope of review of the staff and also gives you an overview of the open items. As you can see, there was one for the DCA and one for the COL.

Next slide.

This slide summarizes the changes to the DCD for this chapter. As you can see in the highlighted portions, the reviewer has chosen these items of interest to discuss in detail. So I will turn it over for the DCD to Steve. As a matter of fact, he reviewed both the DCD and the COL, and he will start off with the DCD, and then he will turn it over to Ravi for the COL.

Of course, you can ask questions outside of these, if you like.

CHAIR RAY: Thank you.

MR. SCHAFFER: I know it is late in the afternoon, and we are talking radwaste.

CHAIR RAY: No, we're doing pretty good. We're trying to catch up.

(Laughter.)

MR. SCHAFFER: The back-end of the plant.

I have to say, though, that these are the systems that radioactivities released to the environment are a certainty. So take that, you PRA.

(Laughter.)

To the next slide, I want to talk a little bit about our review of the change in the three monitoring tanks. Maybe what didn't become clear was there are three radwaste monitoring tanks, 15 gallons each, in the aux building right now -- oh, 15,000 gallons each.

They decided to add, for their flexibility, three more. But instead of putting it in the aux building, there was no more room, they had to extend the radwaste building.

MEMBER BANERJEE: So how big are these? I

mean I know 15,000 gallons, but in sort of physical size?

MR. MENEELEY: This is Tim Meneeley from Westinghouse.

They are about 12 feet in diameter and 18 feet tall. Not exactly, but about.

MEMBER BANERJEE: That's 15,000 gallons? That's 15,000?

MR. MENEELEY: That's correct.

MR. SCHAFFER: So, as described before, one of our issues was that, because it is now in a radwaste building which is not seismically-qualified, is there any sort or radioactive concentration limits that might be exceeded that would require them to actually be in a much more qualified building?

They provided analysis which used the GALE code, which is one of our standard accepted codes, to show that the inputs to these waste streams, from these waste streams, that would go into these monitoring tanks, using this code, would show that the concentrations would never exceed any of the

limits that are in Reg Guide 1.143, so they could put it in the radwaste building.

Another part of our review, which Ed will cover actually, is now that they have had these three large tanks that are sitting in a radwaste building that might not have the right rad protection classification for that building, we wanted to look at the doses that would occur, the exposures that would occur to workers within that area. Ed will cover that review.

One of the other things that I just wanted to mention, they had mentioned in Chapter 14, which is their pre-operational program, that they would do some pre-operational testings on the resins in the demineralizer vessels. There's four demineralizers in the liquid radwaste system.

When you went to Chapter 11 in their pre-operational section and described their pre-operational testing, there was nothing about the resins. So we asked them to put some testing in that actually confirmed that the right amount of the right

resins would be in the demineralizers.

Those issues were all addressed. So there are no open items in Section 11-2, which is the liquid radwaste system.

Going on to the next slide --

MR. LEE: I guess what you're just saying is that the tanks won't need to be seismically-qualified?

MR. SCHAFFER: That's correct, yes.

MR. LEE: Okay. So you could have a spill due to a seismic event, and it still would fall within the limits?

MR. SCHAFFER: Yes.

MR. LEE: Okay.

MR. SCHAFFER: That is Reg Guide 1.145.

On the gaseous waste management system side --

CHAIR RAY: By the way, I'm sorry, when you talked earlier, you talked about the tank was the largest source, and assumed it failed and checked the consequences. But if you've got three tanks in a

building that is not seismically-qualified, you have to assume all three tanks fail, I assume?

MR. SCHAFFER: Well, yes and no.

(Laughter.)

CHAIR RAY: Tell me about the no.

MR. SCHAFFER: Okay. We have our Advanced Technical Position, 11-6, which sort of gives us the instructions on how to do that, but to me that is no answer because that is just following the cookbook.

But the real answer is we are actually searching for the largest source term. So it winds up to be it is the hold-up tank before the stuff gets into the radwaste system that is the source term.

CHAIR RAY: Of course it would be, but, nevertheless, whatever the consequences are, I'm assuming -- tell me if I'm wrong -- oh, who do I say this? You at least check to make sure that that tank that you designate as the highest source term isn't less than all three tanks --

MR. SCHAFFER: Oh, yes. Yes, that's part

of it.

You also have to realize the other aspect of it is that the reason we are doing this consequence analysis isn't like what is in Chapter 15. It is really for when the first generation of plants were starting to operate. There were a lot of "oops", where people put wrong valve connections in, and the like, and they managed to discharge almost full contents of tanks.

So this Advanced Technical Position was really to cover that "oops", and they looked at it as, well, as long as we assume a failure, we will be able to duplicate or simulate the resulting releases that happen through all these operational difficulties that they had in the beginning.

CHAIR RAY: All right, but still, if the three tanks together was more than the one tank that you've identified, I would want to argue with you about whether you had the right --

MR. SCHAFFER: The likelihood that those three tanks would have -- see, the tank that has the

collection before the radwaste system is assumed to have primary coolant in it, and the monitoring tanks have already had the processed waste.

CHAIR RAY: I stand on what I said.

MR. SCHAFFER: Okay.

(Laughter.)

CHAIR RAY: Which is, you put three tanks in a building that isn't seismically-qualified, we need to talk about it if you don't think all three of them will fail in seismic event.

MR. LEE: One of the reasons I broached the questions is, in your earlier figure, you showed this site, the Bellefonte site, as being essentially on a peninsula, surrounded on the water by at least two sides, maybe even three. So my hydrology sense tells me that the water table is relatively shallow there. I don't know how quickly the travel times would be to those water bodies.

MR. SCHAFFER: That was a bounding estimate. You will probably hear more about it when you hear about Chapter 2.

MR. LEE: Okay.

CHAIR RAY: Go ahead, Steve.

MR. SCHAFFER: Okay.

MR. MENEELEY: May I interject, just to supplement what Steven had said? This is Tim Meneeley from Westinghouse.

In our evaluation, we showed that the contents of any one tank for isotopes other than tritium are less than a tenth of a percent of the (a)(2) values, and for tritium it is about 6 percent of the (a)(2) values. So the three tanks together are still very far below the (a)(2) values.

CHAIR RAY: Okay. Fine. Thank you.

MR. SCHAFFER: One of the changes that caught our eye with the gaseous waste management system was, although they didn't change the design of the delay beds, it is still the same size with the same amount of charcoal, they reduced its capacity. They said that each of the delay beds could handle 100 percent of the capacity, and now they came back and said it was 50 percent.

So we said, what's that? Tell us more about that.

And they did an analysis, again, using the GALE code. Because we were concerned that if you could only deal with 50 percent capacity, and one of the delay beds were out, would you have a problem with your releases?

So they did an analysis with the GALE code with only one delay bed and showed that the releases and, obviously, the resulting doses wouldn't be increased significantly.

So we reviewed that analysis. We checked all the inputs to the GALE code and verified that, yes, indeed, the results were correct. We put that issue to bed.

The one issue that is still open really was that the consequence analysis for the gaseous side was missing. It was actually performed, but never made it into the FSAR. We have received the response to that RAI now, and we are reviewing it. So it is still an open item.

CONSULTANT KRESS: How big are these charcoal beds? That's a lot of charcoal, isn't it? Several tons?

MR. SCHAFFER: Yes, it's like 2,000 --

MR. MENEELEY: I think the total is 5400 pounds of charcoal.

CONSULTANT KRESS: How do you assure that the flow is distributed well through a bed that big? I mean, are there diffusers on the front end, channels to flow into, so that you can be sure all of the charcoal is active? I'm not a charcoal bed designer.

MR. MENEELEY: Tim Meneeley from Westinghouse.

There are correlations both in NUREG-0017 and in other places of the literature which give, similar to an ion exchange vessel, the flow areas one needs to look at, the ratio of flow diameter to length. Our beds are designed as a fairly small pipe in a serpentine configuration to ensure that you have a small play area and a very long configuration.

CHAIR RAY: Very good.

MR. MENEELEY: Okay.

MR. SCHAFFER: Okay. We are actually going to skip 11.4. Really, the only change was an improvement on a materials-handling pump. So it is a positive displacement pump.

So we are going to go on to 11.5, which is the radiation monitoring system. We noticed that the system, the standard, the ANSI standard that they were going to design the system to was the 1969 ANSI standard for sampling of a gaseous or duct system, event system. This is sampling for measurement of radioactivity.

The '69 standard has been withdrawn and replaced by the '99 standard. Part of the reason it has been withdrawn is because it is shown to have not been 100 percent reliable on systems designed that way, getting a representative sample of the gas stream for analysis.

So that is the reason why they changed, withdrew that standard, changed it to the '99. The

'99 standard is very less prescriptive than the 1969 standard. It is performance-based.

So we questioned Westinghouse on the use of this standard. Their concern was that there is a bias to the 1999 standard towards a single-nozzle collection system. They wanted more flexibility than just design to single-nozzle. They wanted to maybe use arrays, sampling arrays, and the like.

From my point of view, the staff's point of view, it was, well, we wouldn't care how you situate the arrays or whether you use arrays or a single-nozzle as long as you can prove to us that you took a representative sample.

So what we did was is we gave them the flexibility to design it according to this '69, which could have multiple arrays, but they would meet the performance standards of the '99 standard, the performance criteria. They listed all the relevant performance criteria in the FSAR and they are going to meet that for their initial testing.

We closed that item, so there are no more

open items on 11.5.

With that, we have finished the DCD.

MS. SANDERS: Do you have any questions?

(No response.)

We will turn it over to Ravi for the COL presentation.

MR. JOSHI: Okay. I will not take much more time. I just want to mention that the table that we have provided actually describes the efficacy of Bellefonte.

Steven is going to talk about the highlighted items, which are of the most interest to him at least.

MR. SCHAFFER: We will go to the next slide.

Now we are talking about the effluent doses to the general public both through the liquid and the gaseous systems. For both the liquid and gaseous systems, this slide lists the activities that we did to convince ourselves that they do meet Appendix I.

We confirmed the liquid and gaseous effluent releases. We made sure that they used the right ones that were from the DCD. We confirmed the appropriate exposure pathways. We confirmed the use of the dilution and the atmospheric dispersion.

CHAIR RAY: Steven, I'm going to ask you if you can focus on the things that you think are problematic here, in the interest of time.

MR. SCHAFFER: Okay.

CHAIR RAY: We need to get through Chapter 12 as well.

MR. SCHAFFER: In the interest of time, let's go to the next slide.

(Laughter.)

CHAIR RAY: Okay. That's fair.

(Laughter.)

MR. SCHAFFER: But the bottom line is our analysis actually showed higher doses -- I'm sorry -- lower doses than the applicant, and you can see that in the table. You can see the Appendix I dose criteria for liquid, gaseous iodines and particulates

and for the 40 CFR 190. That is the EPA standard that has to look at the entire site. So they would have to look at their two units. Those are the individual dose results.

The reasons we are different in the liquid systems, our dilution was actually a little less conservative from theirs. The reason we are different than the gaseous side was some of our locations that we chose to do the individual dose calculations were not as conservative as the applicant's.

Now to address the other part -- the next slide -- to address the other part of Appendix I, we have to look at the cost/benefit analysis. If you add, augment any component to the liquid system or the gaseous system, could they do it in less than $1,000 per person rem? Our analysis showed that, no, they can't.

You can see for the liquid systems our results showed that it would cost them $33,000 to $40,000. The reason there's two numbers is the first

number is for the thyroid dose, and the other number is for the total body dose.

Going to the next slide for 11.4 and 11.5, we have to describe the operational programs for the process control program for the waste management, the solid waste management system. We have to describe the operational programs that the licensee will actually do to make sure that they can control effluent releases, and once they release it, that their doses are below Appendix I.

So these two templates were developed by NEI and reviewed by the NRC, and SERs are written on them. These templates are placeholders until the real program comes.

You will see, when you look at Chapter 13 for the table, where it shows that they have to have these programs in place, inspected before fuel load.

And the only other issue, again, is the onsite storage of low-level waste. We asked them to address it since they don't have a place to put low-level waste, and we are waiting on the response.

And that's really it.

CHAIR RAY: That seems appropriate to do. So we will see what the response is to your open item, I guess.

What do we know about the open item in terms of when it is likely to be addressed?

MS. AUGHTMAN: This is Amy Aughtman from Southern.

We expect to provide a response probably within the next couple of weeks, but we have 45 days from the date the SER is issued.

CHAIR RAY: All right. It's not years in the year?

MS. AUGHTMAN: No.

CHAIR RAY: Okay. All right. Anything more on Chapter 11 then?

(No response.)

Chapter 12? We're not doing that bad, but members need to have a few minutes for discussion before we adjourn. So let's proceed with Chapter 12, please.

MR. TOM RAY: Okay. Do you want me to wait?

CHAIR RAY: One second.

MR. TOM RAY: Again, my name is Tom Ray, AP1000 Licensing Engineer for Chapter 12.

Again, I failed to introduce him last time; I will introduce him for Chapter 12. Our technical lead will be Tim Meneeley, who will be helping out with questions.

Next slide, please.

A little bit about what Chapter 12 is. Chapter 12 is the radiation protection chapter, which has sections in it that cover ALARA, your radiation sources, your radiation protection design features, dose assessment, and health physics facilities design.

Next slide.

The major change is from Rev 15, the DCD, to Rev 17 for Chapter 12, again, similar to Chapter 11. We clarify compliance with 10 CFR 20.1406.

Chapter 12, in and of itself, didn't have

design changes, but due to other design changes throughout the DCD, we had to revise radiation effects. Those design changes were the new radwaste monitoring tanks, increased spent fuel pool capacity, fuel-handling area shielding design, integrated head package, and there was actually an evaluation change for the concrete density in the spent fuel transfer canal and tube channeling.

Next slide, please.

For Chapter 12, there are five open items related to the DCD.

The first one is --

CHAIR RAY: You get the prize, I think, for the most open items.

MR. TOM RAY: What was that?

CHAIR RAY: You get the prize for the most open items, I think.

(Laughter.)

MR. TOM RAY: Is that today?

(Laughter.)

Is that tomorrow?

CHAIR RAY: We'll see tomorrow.

(Laughter.)

MR. TOM RAY: All right.

And I will give you a sense. Most of these open items, actually, we are working closely with the staff to resolve, and we are in the process now of review or close to sending a letter to them.

For the first one, there was more information required on design features for the HVAC system to prevent or minimize contamination of the environment. Again, that goes back to providing clarifying information for 10 CFR 20.1406 for the HVAC system.

There was a question of more detail with airborne radioactivity due to the expanded fuel pool capacity.

Dose during refueling, due to the change in minimal allowable water depth above active fuel. That had to do with, again, it talked about the design changes for the fuel-handling system.

12.3-01 was more detail to determine if

the containment area radiation zones are affected by the integrated head package design. That had to do with both increase or decrease in doses for the actual design itself and then specifically for this. This was during outage, refueling dose.

The last one is density change in spent fuel transfer canal and tube shielding. This actual change in the evaluation impacts on the occupational exposure for that.

So those are the open items for Chapter 12. Questions on those?

CHAIR RAY: I'm just reading, trying to figure out what the last one is here.

MR. ROACH: Actually, the density of the concrete use, the calculations went from 147 pounds per cubic foot to 140. It is within the scope of the latest Reg Guide.

CHAIR RAY: Okay. I see. All right. Thank you.

Thank you.

MS. AUGHTMAN: Ready for the COLA?

CHAIR RAY: Yes.

MS. AUGHTMAN: Okay. I'm Amy Aughtman, and, again, to the side is William Smith, and on the phone are, I believe, three individuals from Enercon Services.

The only additional section that related to things that were outlined in the DCD is Appendix 12-alpha-alpha, which is the Radiation Protection Program.

The first COL information item that we addressed is on ALARA and operational policies. We did that by incorporating by reference the NEI template on ALARA, which is NEI-708. That is the one NEI template that we incorporate by reference that we are still waiting on the approved template to come out for us to incorporate.

12.2-1 is additional contained radiation sources. This is where we describe the controls that we have in place for the sources.

One example of that is field monitoring equipment. The controls are implemented through

written procedures. They are developed in accordance with the Radiation Protection Program.

12.3-1 is administrative controls for radiological protection. Those are described in Appendix 12-alpha-alpha, which 12-alpha-alpha is essentially an incorporation by reference of another NEI template, 07-03.

And information on 12.3-2 is on the criterion methods for radiological protection. We describe the criterion methods for attaining representative measurement of radiological conditions through the use of procedures, and that includes the surveillance requirement.

Item 12.3-3 and 12.3-4 are both described in Appendix 12-alpha-alpha. The first one is on groundwater monitoring, and the second is on the record of operational events of interest for decommissioning. Both of those refer to NEI 08-08, yet another NEI template, which is on the elimination of contamination.

The last item is 12.5-1, the radiological

protection organization and procedures. The organization and procedures are described in Appendix 12-alpha-alpha, again, through the incorporation of the NEI template 07-03.

CHAIR RAY: Amy, if the plant had been built in accordance with Rev 15, just take the groundwater monitoring program, what would have been done? Or what is the difference that the inclusion of this standard 12.3-3 provides? Can you tell me?

MS. AUGHTMAN: I don't know if --

MS. McKENNA: Well, let me start one thing. I think the groundwater monitoring would be outside of the scope of the DCD because it would really depend on some site --

MS. AUGHTMAN: It is an information item.

MS. McKENNA: So it really needed to be something that is addressed on the COL side.

CHAIR RAY: Yes. So, okay, that is fair. I guess I am thinking this is the first time, then, groundwater monitoring gets addressed. Yes. I was in the mode of thinking about changes --

MS. McKENNA: Right.

CHAIR RAY: -- because that's what we have been talking about. So I looked at that and I thought, what the heck are the changes that are being made? You are saying that there isn't any change here; this is just a commitment by the COL, is that right? Or am I wrong?

MS. AUGHTMAN: I am going to ask either --

MR. SMITH: My name is William Smith.

The NEI 08-08, groundwater monitoring, that she is referring to, that is an operational program that will be implemented during operations.

CHAIR RAY: I understand, but it is being addressed here why?

MS. AUGHTMAN: Because I believe -- Tim or Tom, correct me if I'm wrong -- but this is a new information item that either came in with Rev 16 or 17, as a result of some conforming changes that had to be made for 20.14-06.

MR. MENEELEY: That is correct. This is

Tim Meneeley from Westinghouse.

In the process of preparing Rev 16, we were working in advance of the regulatory guidance on 1406, but we had quite a few NRC and other publications. One of the things we thought was indicated was a commitment to a life-of-plant groundwater monitoring program. So we made that commitment in the DCD, so that it would be a standard for all our applicants to have that program.

Now it has since been standardized one more layer by the NEI work, but this is here because we committed in the DCD that our applicants would have a groundwater monitoring program.

CHAIR RAY: Okay. So we are not changing, but we are becoming more specific on this point, groundwater monitoring? I'm trying to figure out what it is that -- it says, program described in Appendix 12, blah, blah, blah. Before that Appendix 12-alpha-alpha was existent, which I assume is at this point in time, what was it?

MR. ROACH: Actually, 12-alpha-alpha

didn't exist until Bellefonte submitted their R-COL application. In the previous version, Rev 15, of the Design Certification Document for the AP1000 there was no commitment for groundwater monitoring along the lines to meet 20.1406. That was added with Revision 16 and, subsequently, 17, and they placed two COL information items on COL applicants. Bellefonte is the first plant to actually provide how they are meeting those. That is what the main change is.

The current operating fleet is a voluntary compliance with NEI 07-07 for groundwater monitoring.

CHAIR RAY: Right, but okay.

MR. CUMMINS: This is Ed Cummins.

We did that with the encouragement of the staff.

(Laughter.)

CHAIR RAY: You would have gotten encouragement from us, if not from the staff. But, like I say, I'm simply trying to understand what is

new information and what is changed information, and if it is changed, what's changed?

MR. GRANT: If I might try -- Eddie Grant with NuStart.

The change information is that there was an addition of a COL item to the DCD. Then the new information is that, in order to address that COL information, the COL applicant provided this groundwater monitoring program information through reference to the NEI template.

CHAIR RAY: And prior to this time, there wasn't any information on this topic in the COL application?

MR. GRANT: Well, there wasn't a COL application prior to this time because --

CHAIR RAY: Okay, yes.

MR. GRANT: We referenced Rev 16, and it was in Rev 16. So it came with our first shot at it.

CHAIR RAY: All right, I'm getting back into history that I probably should not attempt to grapple with at this point in time.

Okay, where were we? Who's got the ball?

MS. AUGHTMAN: I believe we are ready for the next slide.

CHAIR RAY: All right.

MS. AUGHTMAN: And we had one piece of supplemental information in Section 12.4, which is on dose to the construction workers. Our evaluations did confirm that the dose estimates do meet the limits of 10 CFR 20.1301.

We have one confirmatory item that we wanted to describe here, and I believe Eddie alluded to it earlier in his discussion with Chapter 1. We now have an approved template for 07-03, and we have some conforming changes we are going to be providing to our FSAR. Those should be coming in in the next couple of weeks for the staff to review.

There were three open items for Chapter 12. The first two were mostly placeholders, until the NRC completes the review of these NEI templates, and the last is on the construction worker dose program. We are addressing that. That actually did

get submitted to the staff last week for their review, and we are essentially indicating that the operating unit program is going to be responsible for conducting radiological surveys.

CHAIR RAY: That makes sense.

MS. AUGHTMAN: That's it for the COLA.

CHAIR RAY: All right. Staff?

MS. SANDERS: I am waiting for Ravi to bring up the presentation.

I'm Serita Sanders, the Project Manager for Chapter 12 of the Design Certification Amendment.

I will now turn our attention to the staff's review for the DCA as well as the COLA Bellefonte application.

I would like to take this opportunity to acknowledge the staff review team for Chapter 12. We have Edward Roach, who was our lead reviewer, and Steven Schaffer, part of the tech review team, and I'm the DCD Chapter Project Manager, and Ravi Joshi is the Bellefonte COL Chapter PM.

Next slide.

This slide illustrates the scope of review for the staff as well as depicts the overall open items for both the DCA and for the Bellefonte COL.

This slide summarizes the changes to the DCD for Chapter 12, and it also highlights in yellow the topics of interest that the reviewer decided and determined that would be of interest to you.

As usual, you can ask any questions that you want.

After we finish the DCD, Ravi will go over the COL.

Okay, the floor is yours.

MR. ROACH: Good evening.

(Laughter.)

As Serita said --

CHAIR RAY: I'll overlook that comment.

(Laughter.)

MR. ROACH: So I was responsible for the review of the changes in the DCA AP1000 and also the Bellefonte Units 3 and 4 Chapter 12, and also

reviewed the related chapters and tech specs in the course of reviewing the Radiation Protection Program.

Again, we worked closely with other staff, branches, including Balance of Plant, Containment and Ventilation, and Operating Licensing, Unit Performance, and Tech Specs.

The first topic we would like to talk about is the topic of ALARA, assuring that occupational radiation exposure is as low as reasonably achievable. In the DCD, as stated earlier, they did incorporate features that demonstrate the AP1000 design complies with 10 CFR 20.1406.

The real key item here that we are still looking at is using operational experience. There were events in the industry that allowed the venting of tanks, resin transfer lines, to contaminate something in ventilation systems. So we are asking the applicant to provide us information related to that. That is an open item. That is pretty much the major change in that area.

As Steve stated earlier, they did add three waste monitor tanks to the radwaste building. We did model that using a Micro-Shield calculation, Version 5, which is V&V. We did several models, one of which used reactor coolant activity; another used the (a)(2) value or (a)(1) values for activity in one of the tanks to see what the contact dose rate would be and the dose rate on the adjacent space. We also used a model to try to form three tanks and get the dose rate if it was all the worst-possible condition.

The change in response to the RAI to the zone effectively addressed our concerns with having the radiation zone properly characterized as a zone, I believe it is, 3, which is less than 15 millirem per hour, where it was previously identified as less than .25 millirem per hour.

The second item there was the increased capacity of the spent fuel pool. Our questions were along the lines, does that increase the airborne activity over the spent fuel pool due to off-gassing from the fuel? Their analysis concluded that it

didn't because they're off-gassing the space doing one full core offload and not the continued off-gassing of many assemblies. We looked at the calculation on that one.

Next slide, please.

Chapter 12.3 was the radiation detection design features. That generally had the most information in it and the most changes. Major design-related changes that we highlighted would be the decrease in the minimum water depth over the active portion of the fuel when it was being handled, from 9.5 feet to 8.75 feet, within the refueling pool or the spent fuel pool.

We reviewed the change. We reviewed the applicant's calculations, as well as the ANS 57.2 design objectives for lightwater reactor spent fuel pool facilities at nuclear power stations.

The applicant described these changes initially in a technical report, and subsequently, we have had RAIs and supplemental RAIs to review this. We have received the final response from them

describing the ALARA features that they have incorporated, and that one is under review, but it is still an open item at this point.

MEMBER BROWN: You said you had checked or you did your own calculations?

MR. ROACH: On this one, we verified their calculations.

MEMBER BROWN: Okay. Did you verify them close or were they a third to a half the values that were shown for the liquid waste?

MR. ROACH: Actually, the liquid waste, when we did the calculation, their values were conservative. On this one, we did not independently verify the calculations through a computer model. This required a Monte Carlo technology or a discrete ordinate transfer model that we didn't have available at this point, but I did go to their offsite location, review their assumptions, and we have supplemental after discussing it with the shielding folks in-house.

MEMBER BROWN: Okay. So it was an audit,

effectively?

MR. ROACH: Yes.

MEMBER BROWN: Okay.

MR. ROACH: And as I said, their response is in-house right now. It describes the ALARA features. Those ALARA features incorporate, besides revising the refueling machine, to add shielding, an intra-steel shielding on that spent fuel pool handling machine to counteract the decrease in water level.

They also take credit for use of zinc addition and then water chemistry controls during shutdown, which helped to minimize activity in refueling water. Those are discussed in their response.

The other item that I would like to discuss, as we talked earlier, the applicant discussed the integrated head package radiological impact and increase and decrease to verify the radiation zones and the dose for the occupational workers within containment. The integrated package

appears to be beneficial improvement in reducing refueling dose, and it wasn't reflected in there, and the analysis didn't conclude that they would reduce their refueling dose. So there are some questions for the staff.

There are three open items.

Next slide, please.

The dose assessment, again, I said that there is a table that lists all of the refueling dose. That wasn't updated. So that is related to the previous topic.

The last item that I talk about is this area 12.5. We worked closely with Balance of Plant, and the originally spent fuel-handling machine used an auxiliary hoist that allowed you to use a tool that didn't have electric interlocks or mechanical interlocks when you were moving spent fuel, which is contrary to the guidance.

An RAI was asked, and the applicant responded that they would provide interlock on that equipment to prevent activated fuel from being raised

higher than should possibly for personnel safety.

Subsequent to that, they revised their spent fuel-handling machine. So they now have one that doesn't have that hoist. It has additional shielding on it.

Any questions?

MR. JOSHI: Go ahead. You're doing well.

MR. ROACH: Okay. All right.

For Bellefonte, the highlighted here are the ones we will talk about. I will basically hit the high points here.

We discussed earlier the NEI templates. These are standard programs for licensed operating programs to afford licensing. Then the COL applicant will develop a program that meets all the requirements of these documents.

07-03 is the generic program for radiation protection. We spent a lot of time working on that, the COL application and the DC. That one has been accepted by the NRC, a Safety Evaluation Report written and issued. It is in ADAMS. It is a

publicly-held document. It is also a license condition with milestones that they will implement at various stages, when they bring their first sources onsites, when they load fuel, and prior to startup. There's various aspects; there's milestones.

The other two templates, NEI 07-08 provides a generic program for ALARA, which includes the management policy, the commitment, regulatory compliance, the Regulatory Guide 8.8 and 8.10, and qualification of personnel 1.8.

NEI 08-08 is, as we spoke earlier, the generic program for minimization of contamination to meet Regulatory Guide 4.21 or the NRC regulation is 10 CFR 20.1406.

MEMBER BROWN: Do the generic guides require any modification for specific plants?

MR. ROACH: Actually, in the Bellefonte case, within that Appendix 12AA, they provided supplemental information. The templates provides a generic organizational structure and maybe some terms and titles of people that is what TVA uses. So TVA,

in their supplemental, described different basically supplemental information to those templates.

MEMBER BROWN: So they're tailored? While they're generic, they're tailored?

MR. ROACH: Yes.

MR. GRANT: That one is.

MR. ROACH: Okay?

CHAIR RAY: And these last two it appears were affirming things. If you could just focus on any exceptions you want to bring our attention to?

MR. ROACH: Okay. I would just go to the radiation protection design features slide, which is this one.

Basically, the bulk of the COL application for Chapter 12, these are the majority of the COL information items. They commit to both the compliance with NEI 08-08, 20.1406 via the NEI 08-08 template, and also NEI 07-03. Additionally, they meet one of their TMI action items, which is 3D33, which is iodine monitoring to a certain level. So they have those values and that information

specifically in their COL.

The last item we talked about was we did independently verify the construction worker dose estimates. The average worker, according to the applicant, would receive about .54 millirem per year. The staff calculation Steve performed using the inputs and assumptions; we came up with about .7 millirem per year; their maximally-exposed individuals, about 7.1 millirem.

This dose will primarily come from, once Unit 3 is constructed, if it is constructed, as they build Unit 4, the dose from Unit 3 operating for the construction workers working on Unit 4. There is no other co-located site there to provide a dose. That is why the levels are so low.

I think that is about it, other than the open items.

MS. SANDERS: If you don't have any more questions, that concludes our presentation.

CHAIR RAY: Thank you very much, Serita.

Anything else from the members?

(No response.)

Okay, well, we didn't do too badly. Five minutes after 5:00.

I'm going to close the record now, close the phone line, adjourn to the next meeting, and ask that the members and consultant and staff member give us just a few minutes after we take a five-minute break because it won't be possible for us to talk after the meeting tomorrow probably. So we would just like to just talk among ourselves here prior to tomorrow's meeting.

So, with that, we are adjourned.

(Whereupon, at 5:07 p.m., the proceedings in the above-entitled matter were concluded for the day, to reconvene the following day, Friday, July 24, 2009.)

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AP1000 Reference Combined License Application Presentation to ACRS Selected Chapters

Bellefonte site – Artist's rendering

COLA Team Meeting Participants

Scheduled Presenters:

Jack Bailey – TVA

Andrea Sterdis - TVA

Tom Spink – TVA

Eddie Grant – NuStart

Amy Aughtman – SNC

Peter Hastings – AP1000 DCWG

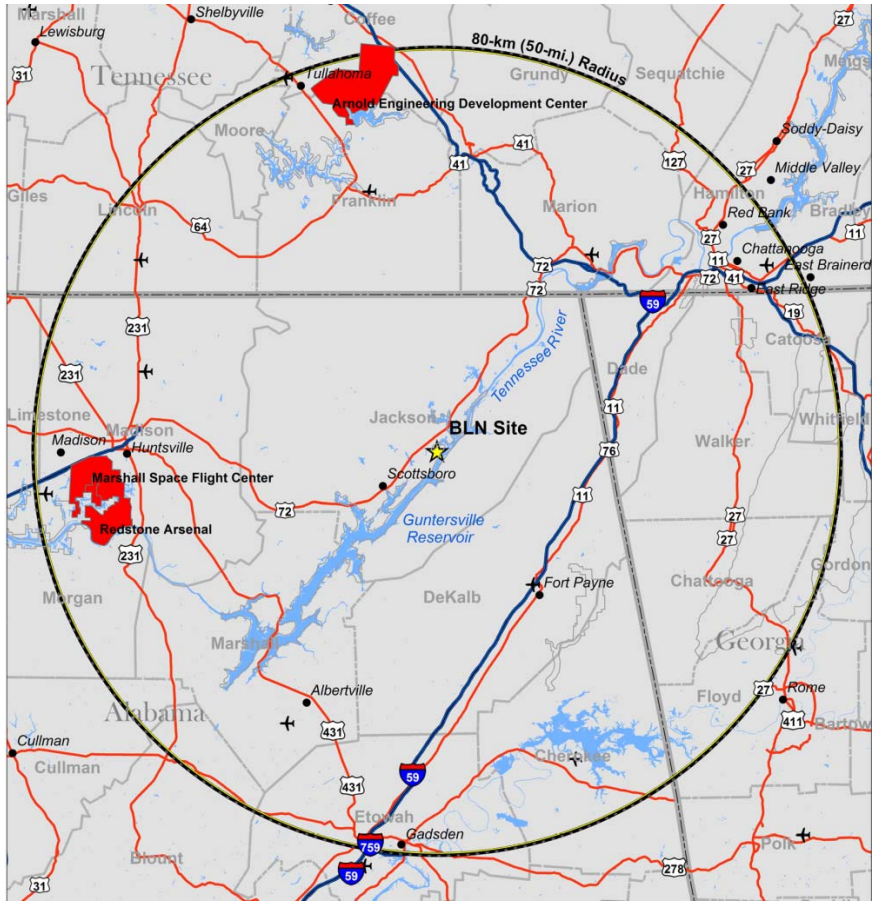
Combined License (COL) Schedule

- 2007 October – Original submittal
- 2008 January – NRC acceptance
- 2009 January – FSAR Revision 1
- 2009 June – SER with Open Items
- 2009 July – ACRS for some chapters

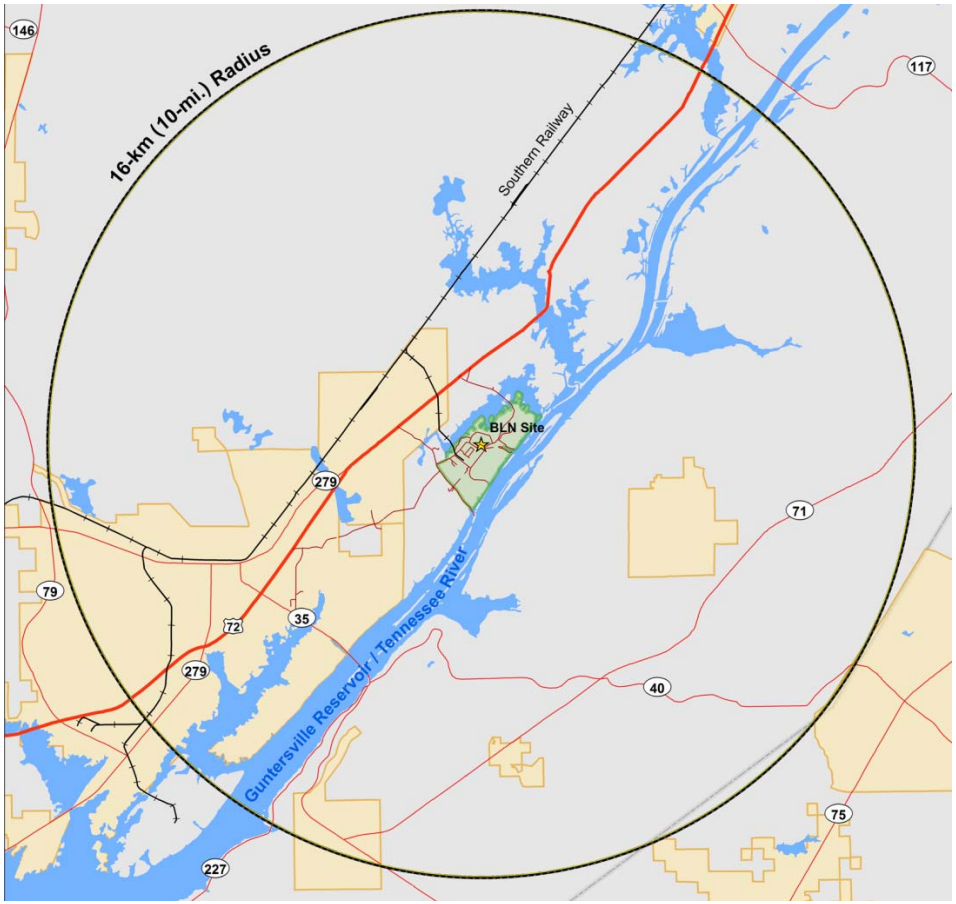
Combined License (COL) Application

- Cover Letter, Affidavits, etc. ("Part 0")
- Part 1 – General & Financial Information
- Part 2 – Final Safety Analysis Report
- Part 3 – Environmental Report
- Part 4 – Plant Specific Technical Specifications
- Part 5 – Emergency Planning Information
- Part 6 – Limited Work Authorization Information
- Part 7 – Departures & Exemption Requests
- Part 8 – Safeguards Information
- Part 9 – Withheld Information
- Part 10 – Proposed License Conditions, including ITAAC
- Part 11 – Enclosures (e.g., QAPD)

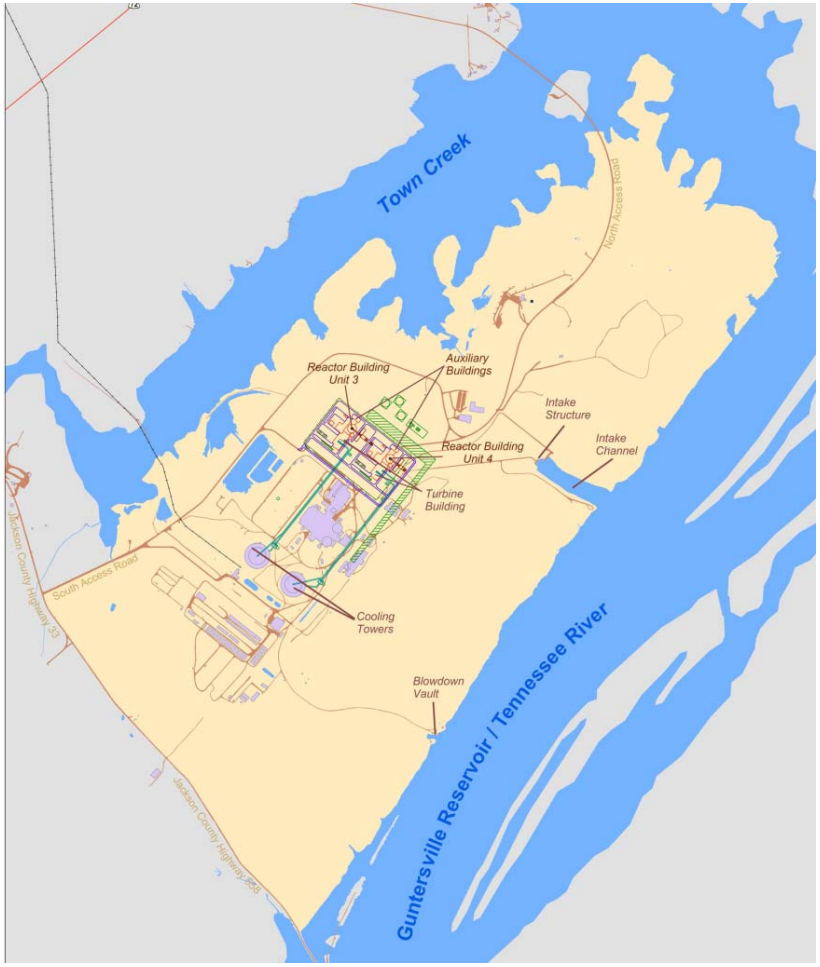
Bellefonte site – 50 mile radius



Bellefonte site – 10 mile radius



Bellefonte site – local site area



AP1000 Design Control Document Amended Design

July 23-24, 2009

Rob Sisk, Manager
AP1000 Licensing and Customer Interface
Westinghouse - Nuclear Power Plants

Westinghouse

DCD Amendment Overview

- Introduction of the WEC AP1000 Team
- The amended design builds on the NRC AP1000 Certified Design (Rev 15)
- Changes were made consistent with regulatory requirements
  - Address COL Information items
  - Address Design Acceptance Criteria
  - Address NRC requirements (i.e., Security)
  - Enhance Standardization
  - Design Maturity (i.e., procurement details; Integrated Head Package)
  - Address editorial changes and changes for consistency

DCD Amendment Overview

- Future changes would be addressed in accordance with the Interim Staff Guidance (DC/COL-ISG-11)
- WEC has received 13 SERs on the amended design. 10 SERs will be discussed today:
  - July 23-24 – Chapters 1, 4, 5, 10, 11, 12, 14, 16, 17 & 19 [Green Rev 17, Yellow Partial Rev 17]
  - October 6& 7 – TBD
  - November 19 &20 –TBD
- No New Exemptions
- No New DAC [continue effort resolve Piping, HFE and I&C DAC]
- 38 Open Items identified in 10 SERs
- 31 Confirmatory Items – Mostly involved with confirming proper incorporation into the final DCD

AP1000 Design Control Document
Amended Design

Chapter 1-
"Introduction and General Discussion"

Westinghouse

Tier 2 Chapter 1 - "Introduction and General Discussion"

- **Chapter Overview**
  - Provides a general overview of the Westinghouse AP1000 simplified passive advanced light water reactor plant; a discussion of the objectives, design criteria operating characteristics of the AP1000; plant site interface requirements; the referenced design documents, and the regulatory basis for the certified design
- Changes to the certified design are discussed in depth in their appropriate chapters
  - Extension of Seismic spectra to soil conditions (Chapters 2 & 3, 19)
  - Revision to buildings for enhanced protection (Chapters 3, 19F)
  - Protection System Instrumentation (Chapter 7)
  - Revision to electrical systems (Chapter 8)
  - *Turbine Manufacturer (Chapter 10)*

Tier 2 Chapter 1 - "Introduction and General Discussion"

- **Changes continued:**
  - Sump Screen Design and Analysis (Chapter 6)
  - Control Room Ventilation (Chapters 6 & 15)
  - Spent Fuel Pool Capacity (Chapters 9 & 12)
  - Update Load Handling Capability (Chapter 9)
  - *Additional Waste-Water Monitoring Tanks (Chapter 11)*
  - Integrated Head Package (Chapters 3, 9 & 12)
  - Revised LOCA Methodology (Chapter 15)
  - *Reactor Internal Changes (Chapters 3, 4, and 5)*
  - *Pressurizer Shape Change (Chapter 5)*

Tier 2 Chapter 1 – "Introduction and General Discussion"

- **OI-1.0-NWE2-01**
  - Reconciliation of the tables, list of figures and COL Action Items will be finalized upon completion of the other chapters

- **OI-1.0-NWE2-02**
  - Confirmation of the final Reg Guides list and other information as part of the reconciliation of Chapter 1 with the other chapters

• Chapter 1
Introduction and General Description of the Plant

R-COLA Chapter 1 – Content

Introduction and General Description of the Plant

1.1 INTRODUCTION
1.2 GENERAL PLANT DESCRIPTION
1.3 COMPARISONS WITH SIMILAR FACILITY DESIGNS
1.4 IDENTIFICATION OF AGENTS AND CONTRACTORS
1.5 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION
1.6 MATERIAL REFERENCED
1.7 DRAWINGS AND OTHER DETAILED INFORMATION
1.8 INTERFACES FOR STANDARD DESIGN
1.9 COMPLIANCE WITH REGULATORY CRITERIA
1.10 NUCLEAR POWER PLANTS TO BE OPERATED ON MULTI-UNIT SITES

R-COLA Chapter 1 – 1 COL Item

BLN 1.1-1 Construction and Startup Schedule
– schedule information provided

STD 1.9-1 Regulatory Guide Conformance
– conformance addressed

STD 1.9-2 Bulletins and Generic Letters
– conformance addressed

STD 1.9-3 Unresolved Safety Issues and Generic Safety Issues
– conformance addressed

R-COLA Chapter 1 – Other

STD SUP 1.1 Describes formatting of the FSAR and LMAs

e.g., COL SUP DEP CDI

BLN SUP 1.4 ID of agents and contractors

STD SUP 1.6 Incorporated by Reference documents

DCD & NEI 06-13, 07-02, 07-03, 07-08

BLN SUP 1.7 Plant specific systems

BLN SUP 1.8 Interfaces, COL items & Departures

STD SUP 1.9 Regulatory Criteria and Guidance conformance

R-COLA Departures (see Part 7)

STD 1.1-1 Organization and Numbering – STD/BLN

- Regulation requires FSAR to follow DCD organization and numbering – Some additional sections needed – various Ch.

BLN 8.2-1 Transformer arrangement for Unit 3 - BLN

- Moved to avoid crossing lines – Ch. 8

BLN 9.2-1 Service water system blowdown flow path – BLN

- All blowdown to waste water systems, none to CWS – Ch. 9

BLN 18.8-1 Relocated TSC and OSC – BLN

- Single TSC for both units – Ch. 13
- OSC moved to DCD TSC Location – Ch. 13

BLN 2.3-1 Exclusion Area Boundary Atmospheric Dispersion Value (χ/Q)

- Plant Specific Analyses – not bounded by DCD

R-COLA Chapter 1 – Open Items

OI 1-1 Final DCD Conforming Changes - STD

- Applicant to update COLA to incorporate final DCD

OI 1-2 License Condition Criteria - STD

- Staff to finalize criteria for license conditions

OI 1.4-1 Interface Content Identification - STD/BLN

- Identify where DCD interfaces are addressed

OI 1.4-2 Regulatory Guide Compliance - STD/BLN

- Address remaining NRC questions

R-COLA Chapter 1 – Open Items

OI 1.4-3 Construction Impacts on Operating Units – STD

- NRC Staff to complete review and identify any concerns

OI 1.4-4 Construction Impacts on Operating Units – STD

- Provide positive statement of implementation timing

OI 1.5-1 Part 30/40/70 Licenses – STD

- Licenses to receive, possess, and use source, byproduct, and special nuclear material – RAI 162 received

AP1000 Design Control Document
Amended Design

Chapter 5

Westinghouse

Tier 2 Chapter 5

- **Chapter Overview**
  - Reactor Coolant System and Connected Systems
  - Integrity of Reactor Coolant Pressure Boundary
  - Reactor Vessel
  - Reactor Coolant System Component and Subsystem Design

Description of Major Changes Post Revision 15

- RCS Loop Instrumentation Relocation
  - Loop 1 narrow range and diverse actuation system RTD relocated upstream of the pressurizer surge nozzle
  - Wide range RTD relocated upstream of the passive residual heat removal nozzle
- Addition of Applicable Code Cases
- Incorporation of Changes for Zinc Injection Capability
- Pressure Boundary Material Changes to Address Material Supply, Fabrication, and Schedule
- Surveillance Capsule Lead Factor and Azimuthal Location Confirmation
- Reactor Coolant Pump Design
  - Revised the heat removal design
  - Flywheel material change
- Pressurizer Configuration Change
- Reactor Vessel Changes
  - Addition of flow skirt
  - Reduction of in-core instrumentation head penetrations
- Normal Residual Heat Removal Low Temperature Relief Valve Size Increase

SER Open Items (OI)

- **OI-SRP-5.2.1 – EMB-01**
  - Addition of Code Cases for ISI (RG 1.147) and O&M (RG 1.192) in DCD
- **OI-SRP5.2.1-EMB-02**
  - Reference to RG 1.84 rather than RG 1.85 in DCD
- **OI-SRP5.4.1-SRSB-01**
  - Design specification for RCP heat exchanger
- **OI-SRP5.4.1-CIB1-01**
  - Addition of flywheel material specifications to be referenced in DCD

• Chapter 5
Reactor Coolant System and Connected Systems

R-COLA Chapter 5 – Content

Reactor Coolant System and Connected Systems

5.1 SUMMARY DESCRIPTION

5.2 INTEGRITY OF REACTOR COOLANT PRESSURE BOUNDARY

5.3 REACTOR VESSEL

5.4 COMPONENT AND SUBSYSTEM DESIGN

R-COLA Chapter 5 – COL Items

STD 5.2-1 ASME Code and Addenda – code year identified

STD 5.2-2 Plant Specific Inspection Program
- program described

STD 5.3-1 Reactor Vessel Pressure – Temperature Limit Curves – post COL item – license condition proposed

STD 5.3-2 Reactor Vessel Materials Surveillance Program
- program described

R-COLA Chapter 5 – COL Items

STD 5.3-4 **Reactor Vessel Materials Properties Verification – as-built item – license condition proposed**

STD 5.4-1 **Steam Generator Tube Integrity**

- **program described**
- **NEI 07-06 "Steam Generator Program Guidelines" and EPRI Steam Generator Management Guidelines**

R-COLA Chapter 5 – Other

5.2 STD SUP Reactor coolant chemistry program

5.3 STD SUP Pressure – temperature control procedures

R-COLA Chapter 5 – Open Items

There are no open items for Chapter 5.

AP1000 Design Control Document
Amended Design

Chapter 10

Westinghouse

Tier 2 Chapter 10

- This Chapter discusses Steam and Power Conversion
- Major changes:
  - Revised interval of turbine valve testing
  - Revised turbine layout to accommodate Toshiba design
  - Replaced Toshiba Turbine Control System with Ovation

Tier 2 Chapter 10

- **5 Open Items (OI) and 1 Confirmatory Item (CI)**
  - **OI-SRP10.2-SBPA-01**
    - Overspeed Protection System meets Single-Failure criterion
  - **OI-SRP10.2-SBPA-02a**
    - ITAAC confirms diversity between overspeed trip systems
  - **OI-SRP10.2-SBPA-02b**
    - Backup turbine speed sensors are magnetic
  - **OI-SRP10.2.3-CIB1-01**
    - Low-trajectory turbine missiles are analyzed
  - **OI-SRP10.2.3-CIB1-02**
    - Clarify discrepancy in turbine missile analysis

• Chapter 10
Steam and Power Conversion

R-COLA Chapter 10 – Content

Steam and Power Conversion

10.1 SUMMARY DESCRIPTION

10.2 TURBINE-GENERATOR

10.3 MAIN STEAM SUPPLY SYSTEM

10.4 OTHER FEATURES OF STEAM AND POWER CONVERSION SYSTEM

R-COLA Chapter 10 – COL Items

STD 10.1-1 Erosion-Corrosion Monitoring

– Program Considers

- Generic Letter 89-08
- EPRI NSAC-202L-R3
- Industry Operating Experience
- CHECWORKS

STD 10.2-1 Turbine Maintenance and Inspection

– post COL item – license condition proposed

BLN 10.4-1 Circulating Water Supply – system described

R-COLA Chapter 10 – COL Items

BLN 10.4-2 **Condensate, Feedwater and Auxiliary Steam System Chemistry Control – system described**

BLN 10.4-3 **Potable Water – system described**

R-COLA Chapter 10 – Other

10.2 **STD SUP** Turbine missile generation for dual units
STD SUP Testing, operations, and maint. procedures
STD SUP Inservice inspection program

10.3 **STD SUP** Operations and maintenance procedures
STD SUP Chemical addition program

10.4 **BLN CDI** Circulating water design to replace CDI
STD SUP Operations, and maintenance procedures
STD SUP Chemical addition program

R-COLA Chapter 10 – 1 Open Item

OI 10.1-1 FAC Program Implementation Schedule - STD

- Applicant to identify schedule for flow accelerated corrosion program

AP1000 Design Control Document
Amended Design

Chapter 11

Westinghouse

Tier 2 Chapter 11

- **Chapter Overview**
  - Radioactive Waste Management
    - Source Terms
    - Liquid Waste Management System
    - Gaseous Waste Management System
    - Solid Waste Management System
    - Radiation Monitoring

Description of Major Changes Post Revision 15

- Increased overall liquid waste holdup capacity and improved operational flexibility by adding three additional liquid waste monitor tanks to the Design
- Clarified compliance with 10 CFR 20.1406 by stating how the design minimizes contamination and generation of waste
- Updated DCD Sections for closure of COL items related to Section 11.2.5.3, “Identification of Ion Exchange and Adsorbent Media,” 11.2.5.4, “Dilution and Control of Boric Acid Discharge” and 11.3.5.2, “Identification of Adsorbent Material”
- Clarified compliance with RG 1.143 and 10 CFR 71
- Corrected inconsistencies in compliance with 10 CFR 50 App. I and 10 CFR 20.1301

SER Open Item

- **OI-SRP11.3-CHPB-01**
  - Section 11.3.3 needed consequence evaluation of a gaseous system leak or failure

- Chapter 11

Radioactive Waste Management

R-COLA Chapter 11 – Content

Radioactive Waste Management

11.1 SOURCE TERMS

11.2 LIQUID WASTE MANAGEMENT SYSTEMS

11.3 GASEOUS WASTE MANAGEMENT SYSTEM

11.4 SOLID WASTE MANAGEMENT

11.5 RADIATION MONITORING

R-COLA Chapter 11 – COL Items

STD 11.2-1 **Liquid Radwaste Processing by Mobile Equipment**
- **mobile equipment design features provided**

STD/BLN 11.2-2 **Liquid Cost Benefit Analysis of Population Doses**
- **method utilized is standard**
- **site specific inputs and results**

STD/BLN 11.3-1 **Gaseous Cost Benefit Analysis of Population Doses**
- **method utilized is standard**
- **site specific inputs and results**

STD 11.4-1 **Solid Waste Management System Process Control Program – commitment to use NEI 07-10A**

R-COLA Chapter 11 – COL Items

STD 11.5-1 **Plant Offsite Dose Calculation Manual (ODCM)**
- **commitment to use NEI 07-09A**

BLN/STD 11.5-2 **Effluent Monitoring and Sampling**
- **standard program described**
- **site-specific program for quality assurance of radiological monitoring programs based on RG 4.15**

BLN 11.5-3 **10 CFR 50, Appendix I**
- **described estimated doses due to liquid and gaseous effluents**

R-COLA Chapter 11 – Other

11.2 STD SUP Quality control provisions of the codes and standards specified in RG 1.143, Table 1

11.3 STD SUP Quality control provisions of the codes and standards specified in RG 1.143, Table 1

11.4 STD SUP Quality control provisions of the codes and standards specified in RG 1.143, Table 1

11.4 STD SUP Describes procedures related to process control

R-COLA Chapter 11 – Open Items

- **Low Level Radwaste Storage - STD**
  - **Address long-term storage capabilities**

AP1000 Design Control Document
Amended Design

Chapter 12

Westinghouse

Tier 2 Chapter 12

- **Chapter Overview**
  - Radiation Protection
    - ALARA
    - Radiation Sources
    - Radiation Protection Design Features
    - Dose Assessment
    - Health Physics Facilities Design

Description of Major Changes post Revision 15

- Clarified compliance with 10 CFR 20.1406 by stating how the design minimizes contamination and generation of waste
- Revised Radiation effects due to design changes
  - New Radwaste Monitor Tanks
  - Spent Fuel Pool Capacity
  - Fuel Handling Area Shielding Design
  - Integrated RV Head Package and Quick-Lock Connectors
  - Concrete Density in Spent Fuel Transfer Canal and Tube Shielding

SER Open Items

- **OI-SRP12.1-CHPB-01**
  - Information on design features for HVAC systems to prevent or minimize contamination of environment
- **OI-SRP-12.2-CHPB-02**
  - More detail with airborne radioactivity due to expanded fuel pool capacity
- **OI-SRP12.3-CHPB-02**
  - Dose during refueling due to the change in minimum allowable water depth above active fuel
- **OI-SRP12.3-CHPB-01**
  - More detail to determine if the containment area radiation zones are affected or if the implementation of the Integrated RV Head Package Design results in an increase or decrease in the refueling dose estimates
- **OI-SRP12.3-CHPB-03**
  - Density change in the Spent Fuel Transfer Canal and Tube Shielding and the impacts on occupational exposure and effect on radiation zoning

• Chapter 12
Radiation Protection

R-COLA Chapter 12 – Content

Radiation Protection

12.1 ASSURING THAT OCCUPATIONAL RADIATION EXPOSURES ARE AS-LOW-AS-REASONABLY ACHIEVABLE (ALARA)

12.2 RADIATION SOURCES

12.3 RADIATION PROTECTION DESIGN FEATURES

12.4 DOSE ASSESSMENT

12.5 HEALTH PHYSICS FACILITIES DESIGN

APPENDIX 12AA – RADIATION PROTECTION PROGRAM

R-COLA Chapter 12 – COL Items

STD 12.1-1 **ALARA and Operational Policies**
– Applicant to incorporate NEI 07-08 template upon approval

STD 12.2-1 **Additional Contained Radiation Sources**
– source controls described

STD 12.3-1 **Administrative Controls for Radiological Protection**
– controls described in Appendix 12AA

STD 12.3-2 **Criteria and Methods for Radiological Protection**
– criteria and methods described

R-COLA Chapter 12 – COL Items

STD 12.3-3 **Groundwater Monitoring Program – program described in Appendix 12AA**

STD 12.3-4 **Record of Operational Events of Interest for Decommissioning – recordkeeping described in Appendix 12AA**

STD 12.5-1 **Radiological Protection Organization and Procedures – organization and procedures described**

R-COLA Chapter 12 – Other

12.4 BLN SUP Dose to Construction Workers
- Dose estimates meet limits of 10 CFR 20.1301

R-COLA Chapter 12 – Confirmatory

CI 12.1-1 NEI 07-03 Adoption - STD
- Applicant to incorporate approved template

R-COLA Chapter 12 – Open Items

NEI 07-08 Approval - STD
- Applicant to IBR final approved template

NEI 08-08 Approval - STD
- NRC Approve and Applicant to adopt final approved template

Construction Worker Dose Program - STD
- Operating unit program to conduct radiological surveys

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AP1000
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FPL.

TVA

TVA

NuStart Energy℠

Presentation to the ACRS Subcommittee

Westinghouse Design Certification Amendment and Bellefonte COL Application Review

Safety Evaluation Report with Open Items

Chapters 1, 4, 5, 10, 11, 12, 14, 16, 17, 19

Eileen McKenna and Stephanie Coffin

July 23 – 24, 2009

ACRS Subcommittee Presentation
Westinghouse Design Certification Amendment and Bellefonte COL Application SER/OI

- Westinghouse Design Certification
  - Current AP1000 Design Certification - Appendix D to 10 CFR Part 52 (Revision 15 to the AP1000 Design Control Document (DCD)) – effective 2006
  - Safety Evaluation Report – NUREG-1793, “Final Safety Evaluation Report Related to Certification of the AP1000 Design”
- Westinghouse Design Certification Amendment
  - Application of May 26, 2007 based upon Revision 16 to the AP1000 DCD
  - Reference to 10 CFR Part 52, Section 52.63
  - Finality of Standard Design Certifications
  - Submittal of Revision 17 of the AP1000 DCD September 22, 2008

ACRS Subcommittee Presentation
Westinghouse Design Certification Amendment and Bellefonte COL Application SER/OI

- Review of the Westinghouse Design Certification Amendment
  - Six phase review schedule
  - Review is focused on changes proposed by Westinghouse, using SRP-based review
  - Issuance of Individual Chapters in Phase 2 (SER with Open Items [SER/OIs]) to become a supplement to NUREG-1793

ACRS Subcommittee Presentation
Westinghouse Design Certification Amendment and Bellefonte COL Application SER/OI

- Bellefonte Combined License application SER with open items
  - Six phase review schedule
  - In general based on revision 1 of the application dated January 21, 2009
  - Incorporates by Reference Westinghouse DCD revision 17

- Structure of SE/OI for Bellefonte
  - Incorporate by reference sections
    - Staff makes finding that IBR is appropriate
    - Refers to the NUREG
  - Standard COL content
    - Staff evaluation will apply to all SCOL applications, as appropriate
  - Site-specific COL content
    - Staff evaluation will apply only to TVA/Bellefonte

- RCOL Applicant Transition
  - Entire SE/OI issued based on the TVA/Bellefonte application
  - Southern/Vogtle responds to all OIs related to standard content
  - Southern/Vogtle responds to all site-specific issues
  - NRC staff evaluates responses and develops Advanced Final SER with no OIs based on Southern Nuclear application. This is expected to be first AP1000 COL application to come to ACRS for final determination.

ACRS Subcommittee Presentation
Westinghouse Design Certification Amendment and Bellefonte COL Application SER/OI

- Presentation sequence
  - Westinghouse present design certification amendment content
  - TVA presents FSAR content
  - Staff presents Westinghouse design certification amendment safety evaluation and Bellefonte COL safety evaluation

- Future Subcommittee Meetings
  - October 6 -7, November 19-20 – additional chapters
  - Possibility of additional subcommittee meeting in early 2010

- Interim Letter Reports

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

Westinghouse AP1000 Design Certification Amendment Application Review
Bellefonte Units 3 and 4 COL Application Review

SER/OI Chapter 1
Introduction and General Discussion

July 23 – 24, 2009

Staff Review Team

- Technical Staff
  - **Steve Koenick,** Project Manager, Organizational Effectiveness and Productivity Branch
  - **Eric Oesterle,** Project Manager, Rulemaking, Guidance and
  - Advanced Reactors Projects Branch
  - **Mike Dusaniwskyj,** Economist, Financial Policy and Rulemaking Branch, NRR
  - **Rick Pelton,** Training and Assessment Specialist, Operator Licensing and Human Performance Branch
- Project Managers
  - **Serita Sanders**, AP1000 DCA
  - **Joe Sebrosky**, AP1000 Bellefonte COL
  - **Sujata Goetz,** Project Manager, AP1000 Projects Branch 1

Overview of DCA and COL

SRP Section/Application Section		Open Items	
		DCA	Bellefonte
1.1	Introduction	0	IBR w/SUP
1.2	General Plant Description	0	IBR w/SUP
1.3	Comparisons with Similar Facility Designs	0	IBR
1.4	Identification of Agents and Contractors	0	IBR w/SUP
1.5	Requirements for Further Technical Information	0	IBR
1.6	Material Referenced	0	IBR w/SUP
1.7	Drawings and Other Detailed Information	0	IBR w/SUP
1.8	Interfaces for Standard Designs	0	1
1.9	Compliance with Regulatory Criteria	0	1
1.10	Nuclear Power Plants to be Operated on Multi-Units Sites	0	2
	General updating of information in Chapter 1	2	N/A
	Other Parts of Application	N/A	3
Totals		2	7

Overview of AP1000 DCD Chapter 1 - Introduction and General Discussion

DCD Section		Summary of Changes to DCA
1.1	Introduction	No major changes
1.2	General Plant Description	Conforming changes
1.3	Comparisons with Similar Facility Designs	No major changes
1.4	Identification of Agents and Contractors	No major changes
1.5	Requirements for Further Technical Information	No major changes
1.6	Material Referenced	Conforming changes
1.7	Drawings and Other Detailed Information	No major changes
1.8	Interfaces for Standard Designs	No major changes
1.9	Compliance with Regulatory Criteria **Appendix – 1A** Conformance with Regulatory Guides	Conforming changes
	Appendix – 1B Severe Accident Mitigation Design Alternatives	No Major changes

AP1000 SER Chapter 1 – Key Functions

- **Historical**
  - Chronology, Key References
- **Summary**
  - Design Features & Changes
- **Generic**
  - Editorial & Conforming Changes, COL Items Tabulation, Regulatory Guides and Criteria
- **Open Items**
  - 2 NRC OIs for Tracking

Bellefonte RCOL Review

Bellefonte RCOL Application Part		Evaluation
1	General and Administrative Information including Financial Information	Section 1.5.1 of SER
2	Final Safety Analysis Report	Evaluated in appropriate SER Chapters
3	Environmental Report	Final Environmental Impact Statement
4	Technical Specifications	Chapter 16 of SER
5	Emergency Plan	Chapter 13 of SER
6	Limited work authorization (not used)	NA
7	**Departures Report**	**Evaluated in appropriate SER chapter**
8	Security Plan	Summary provided in Chapter 13 of SER
9	Withheld Information	Evaluated in appropriate SER Chapter
10	Proposed Combined License Condition including ITAAC	Evaluated in appropriate SER Chapter

Bellefonte COL Technical Topics of Interest

- Departures and Exemptions
  - Departures
    - COL application organization and numbering
    - unit 3 transformer area arrangement
    - service water system blowdown flow path
    - emergency response facility locations
    - exclusion area boundary atmospheric dispersion value
  - Exemptions
    - COL application organization and numbering
    - exclusion area boundary atmospheric dispersion value

Overview of Bellefonte COL FSAR Chapter 1

FSAR Section		Summary of Departures/Supplements
1.1	Introduction	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 Contractors	IBR with site-specific supplements
1.5	Requirements for Further Technical Information	Completely IBR
1.6	Material Referenced	IBR with standard supplement
1.7	Drawings and Other Detailed Information	IBR with site-specific supplement
1.8	**Interfaces for Standard Designs**	**IBR with site-specific supplement**
1.9	**Compliance with Regulatory Criteria**	**IBR with standard supplement**
1.10	**Nuclear Power Plants to be Operated on Multi-Units Sites**	**Standard and site-specific supplemental material**

* IBR - incorporated by reference

Bellefonte COL Technical Topics of Interest

- Open items
  - 1-1, TVA to update application based on outcome of AP1000 design certification amendment
  - 1-2, staff to determine which FSAR commitments require a license condition
  - 1.4-1, TVA to identify how interface items from the AP1000 DCA are addressed in the Bellefonte COL application
  - 1.4-2, Regulatory Guide tables to be updated and confirmed correct
  - 1.4-3, staff to complete review of applicant's assessment of potential hazards due to construction of one unit on operating units on site
  - 1.4-4, TVA to provide a positive commitment for when management programs to be in place to address hazards of construction on operating units
  - 1.5-1, TVA to provide a discussion of which parts of application support issuance of 10 CFR 30 and 40 (byproduct and source material) licenses

Bellefonte COL Technical Topics of Interest

- Financial qualifications review
  - Evaluates financial resources to build operate and eventually decommission a nuclear facility
- Effects of reinstatement of the Bellefonte 1 and 2 Construction Permits on Bellefonte 3 and 4 application
- COL holder items
- Operational program implementation

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Presentation to the ACRS Subcommittee

Westinghouse AP1000 Design Certification Amendment Application Review
Bellefonte Units 3 and 4 COL Application Review

SER/OI Chapter 5
Reactor Coolant System and Connected Systems

July 23 – 24, 2009

Staff Review Team

- Technical Staff
  - **David Terao**, Chief, Component Integrity, Performance and Testing Branch 1, Division of Engineering (CIB1/DE)
  - **Neil Ray**, Acting Chief, CIB2/DE
  - **Yi-Hsiung (Gene) Hsii**, Reactor Systems, Nuclear Performance and Code Review Branch, Division of Safety Systems and Risk Assessment (SRSB/DSRA)
- Project Managers
  - **Perry Buckberg**, AP1000 DCA
  - **Ravindra Joshi**, AP1000 Bellefonte COL

Overview of DCA and COL

SRP Section/Application Section		Open Items	
		DCA	Bellefonte
5.1	Introduction	0	0
5.2	Integrity of Reactor Coolant Pressure Boundary	2	0
5.3	Reactor Vessel	0	0
5.4	Reactor Coolant System Component and Subsystem Design	2	0
Totals		4	0

Overview of AP1000 DCA Chapter 5 - Reactor Coolant System and Connected Systems

DCD Section		Summary of Changes to DCA
5.1	Summary Description	- Minor RCS P&ID changes
5.2	RCPB Integrity	- Clarified seismic limitations in 50.55a for piping design - **Added additional ASME code cases to standard design** - Revised design to incorporate zinc injection into RCS - **Added/revised material specifications for RCPB**
5.3	Reactor Vessel (RV)	- Surveillance capsule lead factors and azimuthal locations - **Submitted a pressure-temperature limit report (PTLR)** - Revised RV insulation (addressed in SER Section 19)
5.4	Component and Subsystem Design	- **Revised the reactor coolant pump (RCP)/flywheel design** - **Revised the RCP heat exchanger design (Rev. 17)** - Revised steam generator design and ISI - Revised material for mainsteam line flow restrictor - Revised pressurizer design (height, diameter) - Revised RNS Long-term makeup to containment

Technical Topics of Interest, AP1000 DCA

Applicable Code Cases

- Westinghouse revised DCD Table 5.2-3 to include additional ASME Code cases used in the standard plant design (Section III).
- The staff requested that Westinghouse also include Code cases used in lieu of ASME Code, Section XI inservice inspection and ASME OM Code inservice testing requirements.
- Westinghouse will provide supplemental information in its DCD to address use of ASME Code cases for ISI and IST.
- This open item is identified as OI-SRP5.2.1-EMB-01.

Technical Topics of Interest, AP1000 DCA

<u>Reactor Coolant Pressure Boundary (RCPB) Materials</u>

- DCA Changes:
  - 304, 304L, 316 and 316L in addition to the current Rev.15 materials (304LN and 316LN)
  - Reactor vessel (RV) material (maximum Cu limit of 0.06%)
  - Delta ferrite upper limit of 20 FN for stainless steel welds
  - Allowance of Zinc addition to the reactor coolant

- RCPB materials comply with requirements of ASME Code, Section III

- No Open Items.

- Revision 17 to AP1000 DCD includes option to use carbon steel – staff currently reviewing.

Technical Topics of Interest, AP1000 DCA

Pressure and Temperature Limits

- Westinghouse addressed submittal of P-T limits by providing a Pressure-Temperature Limits Report (PTLR)
  - PTLR
    - Follows guidelines of GL 96-03
    - Contains bounding P-T limits and complete methodology
  - COL Information Item 5.3-1 (STD COL 5.3-1)
    - Plant-specific P-T limit curves will be addressed by the COL Holder during procurement and fabrication of the reactor vessel prior to fuel load
- NRC staff approved Westinghouse's generic AP1000 PTLR in a letter dated 12/30/08 (ML083470258)

Technical Topics of Interest, AP1000 DCA

<u>Reactor Coolant Pump Flywheel Integrity</u>

- DCA Changes:
  - Heavy tungsten inserts with Type 403 Stainless steel inner hub and 18-Ni maraging steel outer hub.
  - Alloy 625 outer shell
  - Revised flywheel analysis for the above material

- Changes are acceptable:
  - Analysis demonstrates flywheel does not generate missile.
  - Materials are compatible with PWR reactor coolant chemistry.

- One Open Item (OI-SRP 5.4.1-CIB1-01):

  Include flywheel material used in flywheel analysis in DCD.

- In addition, Westinghouse recently proposed a material change to RCP flywheel outer hub (staff is reviewing).

Technical Topics of Interest, AP1000 DCA

<u>RCP External Heat Exchanger Design</u>

- In DCD Rev 15, RCP used thermal barrier internal cooling coils and wrap-around heat exchanger for motor cooling
- DCD Rev. 17 changes motor cooling design to externally mounted, conventional shell and tube HX and stator cooling jacket
- External piping and tube side of external HX is part of pressure boundary components that comply with requirements of ASME Code, Section III
- AP1000 RCP external heat exchanger design specifications describe the external HX mechanical and thermal design bases and requirements
- OI-SRP5.4.1-SRSB-01 - pending submittal of the external HX design specifications

Overview of Bellefonte COL Chapter 5 - Reactor Coolant System and Connected Systems

FSAR Section		Summary of Departures/Supplements
5.1	Summary Description	none
5.2	Integrity of RCPB	STD COL 5.2-1 Use of later Code editions/addenda **STD COL 5.2-2 Plant-specific PSI/ISI program** STD SUP 5.2-1 Primary water chemistry guidelines STD SUP 5.2-2 ISI of threaded fasteners
5.3	Reactor Vessel (RV)	**STD COL 5.3-1 Plant-specific P-T limits curves** **STD COL 5.3-2 Reactor vessel surveillance program** **STD COL 5.3-4 Verify as-built RV beltline materials for Pressurized Thermal Shock** STD SUP 5.3-1 Plant operating procedures for P-T limits
5.4	Component and Subsystem Design	**STD COL 5.4-1 Steam generator tube surveillance program**

Technical Topics of Interest, BLN COL

Plant-specific Inspection Program

- AP1000 COL Information Item 5.2-2

  COL applicant will provide a plant-specific preservice inspection (PSI) and inservice inspection (ISI) program and address NRC Order EA-03-009 or later NRC requirements
- STD COL 5.2-2
  - PSI/ISI “fully described” in BLN COLA and AP1000 DCD as discussed in SECY-05-0197
  - COL applicant will revise FSAR to meet 10 CFR 50.55a(g)(6)(ii)(D) on reactor vessel head inspections
  - Milestones for PSI and ISI implementation: In accordance with ASME Code, Section XI
  - COL holder will submit to NRC a schedule to support operational program readiness after fuel load (COLA Part 10 Proposed License Condition 6)
- No open items

Technical Topics of Interest, BLN COL

<u>Use of Plant-specific P-T Limit Curves</u>

- AP1000 COL Information Item 5.3-1

  COL holder will address use of plant-specific curves
- STD COL 5.3-1
  - BLN committed to update P-T limits using PTLR methodologies approved in AP1000 DCD using plant-specific material properties (COLA Part 10 – Proposed License Condition 2)
  - Milestones for Implementation: prior to fuel load
- No open items

Technical Topics of Interest, BLN COL

<u>Reactor Vessel Surveillance Program (RVSP)</u>

- AP1000 COL Information Item 5.3-2

  COL applicant will address RVSP

- STD COL 5.3-2
  - RVSP “fully described” in BLN COLA and AP1000 DCD as discussed in SECY-05-0197
  - Milestones for RVSP implementation: Prior to initial criticality (FSAR Part 10 Proposed License Condition 3.J.1)
  - COL holder will submit to NRC a schedule to support operational program readiness after fuel load (COLA Part 10 Proposed License Condition 6)
- No open items

Technical Topics of Interest, BLN COL

<u>RV Beltline Material Properties Verification</u>

- AP1000 COL Information Item 5.3-4

  COL holder will provide plant-specific RV beltline material properties including pressurized-thermal-shock (PTS) evaluation and submit report to NRC prior to fuel load

- STD COL 5.3-4
  - Provide plant-specific beltline material properties prior to fuel load (COLA Part 10 – Proposed License Condition 2)
  - Submit PTS evaluation at least 18 months prior to fuel load for staff review (COLA Part 10 – Proposed License Condition 6)
- No open items

Technical Topics of Interest, BLN COL

<u>SG Tube Surveillance Program</u>

- AP1000 COL Information Item 5.4-1

  COL applicant will address a steam generator tube integrity and surveillance program

- STD COL 5.4-1

– Applicant described SG tube integrity and surveillance program for BLN in FSAR

– Acceptable because the program is based on the standard technical specifications, NEI 97-06 and EPRI SG guidelines

- No open items

United States Nuclear Regulatory Commission

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Presentation to the ACRS Subcommittee

Westinghouse AP1000 Design Certification Amendment Application Review
Bellefonte Units 3 and 4 COL Application Review

SER/OI Chapter 10
Steam and Power Conversion Systems

July 23 – 24, 2009

Staff Review Team

- Technical Staff
  - **David Terao**, Chief, Component Integrity, Performance and Testing Branch 1, Division of Engineering (CIB1/DE)
  - **Gregory Makar**, CIB1/DE
  - **Devender Reddy**, Balance of Plant Branch 1, Division of Safety Systems and Risk Assessment (SBPA/DSRA)
- Project Managers
  - **Perry Buckberg**, AP1000 DCA
  - **Sujata Goetz**, AP1000 Bellefonte COL

Overview of DCA and COL

SRP Section/Application Section		Open Items	
		DCA	Bellefonte
10.1	Introduction	0	1
10.2	Turbine Generator	5	0
10.3	Main Steam Supply System	0	0
10.4	Other Features	0	0
Totals		5	1

Overview of AP1000 DCA Chapter 10 - Steam and Power Conversion Systems

DCD Section		Summary of Changes to DCA
10.1	Summary Description	- Revised design description of SPC system
10.2	Turbine-Generator	- **Revised turbine overspeed protection (Rev. 17)** - **Changed turbine rotor design from W/MHI to Toshiba**
10.3	Main Steam Supply System	- Changes to SPC system relief valve setpoints
10.4	Other Features of SPC System	- Added 7th stage feedwater heaters to condensate and feedwater system

Technical Topics of Interest, AP1000 DCA

<u>Turbine Overspeed - D-EHC System</u>

- Changes:
  - Replaced mechanical overspeed protection device with a diverse electrical overspeed device
- Staff Evaluation:
  - Tier 1 ITAAC needed to ensure diversity between the two electrical overspeed protection devices
- Open Item:
  - Pending review of RAI response

Technical Topics of Interest, AP1000 DCA

Turbine Rotor Integrity

- DCA Changes:
  - Toshiba turbine replaces the model in the certified design (Westinghouse/Mitsubishi)
  - Valve test interval increased from 3 months to 6 months
  - New missile-generation probability and valve-test-frequency reports submitted to support the turbine-design change
  - Submittal of maintenance/inspection program changed from “3 years after license approval” to “prior to fuel load”

- Staff Evaluation:
  - Based on operating experience, the missile-probability requirements of GDC 4 can be met with the new design and valve-test frequency
  - The maintenance/inspection program will be verified using as-built information

- Two Open Items:
  - **Open Item OI-SRP10.2.3-CIB1-01**

    Provide a bounding turbine-missile analysis for low-trajectory missiles for dual units
  - **Open Item OI-SRP 10.2.3-CIB1-02**

    Correct an error in the turbine-missile-probability value in the valve-test-frequency report

Overview of Bellefonte COL Chapter 10 - Steam and Power Conversion Systems

FSAR SECTION		SUMMARY OF DEPARTURES/SUPPLEMENTS
10.1	Summary Description	**STD COL 10.1-1 Flow Acceleration Corrosion Program**
10.2	Turbine-Generator	**STD COL 10.2-1 Turbine Maintenance/Inspection Program** STD SUP 10.2-1 Turbine Missile For Dual Units STD SUP 10.2-3 ISI For Turbine Assembly STD SUP 10.2-4 Pre-op/Start-up Testing STD SUP 10.2-5 Operation/Maintenance Procedures
10.3	Main Steam Supply System	STD SUP 10.3-1 Procedures To Control Steam-hammer STD SUP 10.3-2 Main Steam Chemistry STD SUP 10.3-3 Procedures To Control IGSCC
10.4	Other Features of SPC System	BLN COL 10.4-1 Circulating Water System BLN COL 10.4-2 Secondary-side Chemical Additives BLN COL 10.4-3 Potable Water (Ref. Ser 9.2.5) STD SUP 10.4-1 Procedures To Control CFS Water-hammer STD SUP 10.4-2 Secondary-side Chemistry **BLN CDI Circulating Water System (CWS)**

Technical Topics of Interest, BLN COL

<u>Flow-Accelerated Corrosion Program</u>

- AP1000 Information Item 10.1-1

  COL applicant will address an erosion-corrosion monitoring program (flow-accelerated corrosion)

- STD COL 10.1.1

  - Applicant described the FAC monitoring and management program in the FSAR

  - Acceptable because applicant is following EPRI NSAC-202L and using CHECWORKS

- Open Item 10.1-1: Include the program implementation schedule in the COLA

Technical Topics of Interest, BLN COL

<u>Turbine Maintenance/Inspection Program</u>

- AP1000 COL Information Item 10.2-1
  - COL applicant will submit and implement a turbine maintenance and inspection program
- STD COL 10.2-1
  - Applicant will submit a program that is consistent with the DCD and based on the as-built rotor
  - Acceptable because the applicant will provide the program prior to fuel load
  - No open items

Technical Topics of Interest, BLN COL

<u>Circulating Water System</u>

- BLN CDI:

  The applicant provided plant specific design, operation, instrumentation and controls, flood protection, and chemical injection for the BLN CWS.

- Staff Evaluation:

  The staff evaluated the BLN CWS site-specific information in accordance with the Commission regulations and SRP guidance, in particular protection against flooding.

- The staff finds the BLN CWS site-specific design acceptable - no open items.

Technical Topics of Interest, BLN COL

Circulating Water System (Cont.)

- CWS water chemistry is maintained by the Chemical Storage and Transfer System.
- Plant chemistry specifies the required chemicals used within the system.
- Chemical injection maintains a non-corrosive, non-scale-forming condition and limits the biological film formation that reduces the heat transfer rate in the condenser and cooling towers.
- Chemicals selected are compatible with selected materials or components used in the CWS.

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SER/OI Chapter 11
Radioactive Waste Management

July 23 - 24, 2009

Staff Review Team

Technical Review Team

- **Steven Schaffer**, Health Physicists (Lead)
- **Joshua Wilson**, Radwaste System Engineer
- **Douglas Dodson**, Radwaste System Engineer

Project Managers

- **Serita Sanders**, AP1000 DCD
- **Ravindra Joshi**, AP1000 Bellefonte COL

Overview of DCA and COL

SRP Section/Application Section		Open Items	
		DCA	Bellefonte
11.1	Source Term	0	IBR
11.2	Liquid Waste Management System	0	0
11.3	Gaseous Waste Management System	1	0
11.4	Solid Waste Management System	0	1
11.5	Radiation Monitoring	0	0
Totals		1	1

Overview of AP1000 DCD Chapter 11 Radioactive Waste Management

DCD SECTION		SUMMARY OF CHANGES TO DCD
11.1	Source Term	• No technical changes
11.2	Liquid Radioactive Waste Management	• **3 additional waste monitoring tanks in the radwaste building** • Extension of the radwaste building • Selection of ion exchange and adsorption media by plant operator • **Preoperational confirmation of resins**
11.3	Gaseous Radioactive Waste Management	• **Reduced capacity of the charcoal delay beds by 50%** • Monitoring temperature instead of moisture in gas of the moisture separator • Added Automatic isolation of guard bed • Closed discharge isolation valve to maintain positive pressure
11.4	Solid Radioactive Waste Management	• Replaced progressive cavity pump with a material handling positive displacement pump
11.5	Radiation Monitoring	• Switched from offline to inline monitors for service water blowdown and liquid radwaste discharge • Added monitors and improved performance of some monitors • **Design standard for gaseous sampling**

Technical Topics of Interest, AP1000 DCD

Liquid Waste Management System

- Additional monitoring tanks design complies with RG 1.143
- Added a preoperational confirmation of resin type and amount in demineralizer vessels
- No open items

Technical Topics of Interest, AP1000 DCD

Gaseous Waste Management System

- GALE code analysis proves reduction in delay bed capacity has small effect on gaseous releases
- Analysis of system leak or failure missing from DCD (BTP 11-5)
- One open item

Technical Topics of Interest, AP1000 DCD

Radiation Monitoring System

- ANSI N13.1-1969 vs. ANSI/HPS N13.1-1999
- No open items

Overview of Bellefonte FSAR Chapter 11 Radioactive Waste Management

FSAR SECTION		SUMMARY OF DEPARTURES/SUPPLEMENTS
11.1	Source Term	• None - Incorporated by reference with no departures or supplements
11.2	Liquid Radioactive Waste Management	• STD COL 11.2-1, Processing by mobile equipment • **BLN COL 11.2-2, Cost-benefit analysis of population doses** • **BLN COL 11.5-3, Individual dose limits in Part 50 Appendix I** • STD SUP 11.2-1, Quality assurance
11.3	Gaseous Radioactive Waste Management	• **BLN COL 11.3-1, Cost-benefit analysis of population doses** • **BLN COL 11.5-3, 10 CFR 50, Appendix I** • STD SUP 11.3-1, Supplemental information on quality assurance
11.4	Solid Radioactive Waste Management	• **STD COL 11.4-1, Solid waste management system process control program** • STD SUP 11.4-1, Quality assurance
11.5	Radiation Monitoring	• **STD COL 11.5-1, ODCM** • STD COL 11.5-2, Effluent monitoring and sampling program • BLN COL 11.5-2, Use of existing programs

COL Chapter 11 - Doses from Routine Liquid and Gaseous Effluent Releases

Staff performed the following review and analysis:

- Confirmed liquid and gaseous effluent releases
- Confirmed appropriate exposure pathways
- Confirmed the use of appropriate liquid dilution, and atmospheric dispersion/deposition
- Confirmed the use of appropriate land usage parameters
- Verified Applicant's calculated doses using NRC recommended models
- Performed an independent dose assessment for liquid and gaseous pathways showing the Applicant's doses to be bounding

Doses from Routine Liquid and Gaseous Effluent Releases and Comparison to Regulatory Criteria BLN COL

Regulation	Type of Effluent	Pathway	Organ	Regulatory Limit (mrem/yr per unit)	Applicant SAR (mrem/yr per unit)	NRC SER (mrem/yr per unit)
10 CFR 50, Appendix I	Liquid	all	total body	3	0.206	0.0834
		all	any organ	10	0.265	0.136
	Gaseous	all	total body	5	0.158	0.0617
		all	skin	15	0.957	0.312
	Iodine & Particulate	all	any organ	15	9.11	4.93
	Gaseous	γ air dose	n/a	10 mrad	0.265 mrad	0.263 mrad
		β air dose	n/a	20 mrad	1.39 mrad	1.39 mrad
40 CFR 190	all	all	total body	25 per site	1.25 (2 units)	0.717 (2 units)
	all	all	thyroid	75 per site	18.6 (2 units)	10.1 (2 units)
	all	all	other organs	25 per site	4.69 (2 units)	2.88 (2 units)

Technical Topics of Interest, BLN COL
Cost-Benefit of Radwaste System Augments

Liquid System Augment

- ~$33,000 to $40,000 per person-rem

Gaseous System Augment

- ~$1200 to $4000 per person-rem

NEI Templates for FSAR Chapters 11.4 and 11.5

Template for Program Descriptions

- NEI 07-10, Generic FSAR Template for the Process Control Program
- NEI 07-09, Generic FSAR Template for the Offsite Dose Calculation Manual (ODCM) Program Description

Technical Topics of Interest, BLN COL

Solid Waste Management System

- Use of approved NEI template to fulfill operational program description for the Process Control Program
- Onsite or offsite storage of low-level radioactive waste
- One open item

Technical Topics of Interest, BLN COL

Radiation Monitoring for Process and Effluent Systems

- Use of approved NEI template to fulfill operational program description for the Offsite Dose Calculation Manual
- No open items

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SER/OI Chapter 12
Radiation Protection

July 23 - 24, 2009

Staff Review Team

Technical Review Team

- **Edward Roach**, Sr. Health Physicist
- **Steven Schaffer**, Health Physicist

Project Managers

- **Serita Sanders**, AP1000 DCD
- **Ravindra Joshi**, AP1000 Bellefonte COL

Overview of DCA and COL

SRP Section/Application Section		Open Items	
		DCA	Bellefonte
12.1	Ensuring ALARA	1	1
12.2	Radiation Sources	1	0
12.3	Radiation Protection Design Features	3	1
12.4	Dose Assessment	0	1
12.5	Health Physics Facilities Design	0	0
Totals		5	3

Overview of AP1000 DCD Chapter 12

Radiation Protection

DCD SECTION		SUMMARY OF CHANGES TO DCD
12.1	Ensuring ALARA	• **Facility changes and general design layout for 10 CFR20.1406 considerations.** • No other technical changes
12.2	Radiation Sources	• **Added three waste monitoring tanks in the radwaste building** • Increase Spent Fuel Pool overall capacity
12.3	Radiation Protection Design Features	• **Changed Fuel Handling Area Shielding Design** • Described facility and layout designs for meeting 10CFR20.1406 • **Added Integrated Head Package (IHP) and quick-lock connections** • Changed the overall assumed concrete shielding density
12.4	Dose Assessment	• Impact of Integrated Head package not described
12.5	Health Physics Facilities Design	• **Spent fuel pool water level, spent fuel handling and dose**

Technical Topics of Interest, AP1000 DCA

Ensuring that Occupational Radiation Exposures Are As Low As is Reasonably Achievable (ALARA)

- Incorporated features to demonstrate AP1000 design complies with 10 CFR 20.1406
- One open item

Technical Topics of Interest, AP1000 DCA

Radiation Sources

- Three waste monitor tanks added- Radwaste Building
- Effect of increase in spent fuel pool capacity (619 to 884 spaces)
- One open item

Technical Topics of Interest, AP1000 DCA

Radiation Protection Design Features

- Change in water level when moving spent fuel
- Design features to meet 10CFR20.1406
- IHP radiological impact (zones/dose)
- Change in concrete shielding density
- Three open items

Technical Topics of Interest, AP1000 DCA

Dose Assessment

- Impact of Integrated Head Package not reflected in DCD Section12.4
- No open items

Technical Topics of Interest, AP1000 DCA

Health Physics Facilities Design

- Spent Fuel handling and dose
  - SFP Handling tool interlocks
- No open items

Overview of Bellefonte FSAR Chapter 12 Radiation Protection

FSAR SECTION		SUMMARY OF DEPARTURES/SUPPLEMENTS
12.1	Assuring ALARA	• **STD COL 12.1-1- ALARA and operational policies** • STD SUP 12.1-1- use of video records
12.2	Radiation Sources	• STD COL 12.2-1, Miscellaneous Sources
12.3	Radiation Protection Design Features	• STD COL 12.3-1, administrative controls for access • **STD COL 12.3-2, criteria and methods for obtaining representative measurements** • **STD COL 12.3-3, groundwater monitoring** • **STD COL 12.3-4, program to ensure documentation of operational events**
12.4	Dose Assessment	• **BLN SUP 12.4-1, dose to construction workers**
12.5	Health Physics Facility Design	• **STD COL 12.5-1, radiation protection program description** • BLN DEP 18.8-1, ALARA briefing room

NEI Templates

- NEI 07-03A Generic FSAR Guidance for Radiation Protection Program Description,
- NEI 07-08 Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures Are As Low As Is Reasonably Achievable
- NEI 08-08 Generic FSAR Template Guidance for Life Cycle Minimization of Contamination

COL Chapter 12 – Radiation Protection

Staff performed the following review and analysis:

- Confirmed commitment to ALARA policy
- Confirmed appropriate exposure pathways for construction workers
- Confirmed the use of appropriate milestones to implement ALARA/RP program as necessary
- Confirmed the RP program includes appropriate measurement and work control guidance
- Verified Applicant's calculated doses for construction workers using NRC recommended models

Technical Topics of Interest, BLN COL

Assuring that Occupational Radiation Exposures are ALARA

- Use of generic NEI templates to fulfill operational program and policy description for the ALARA Program
- Implementation of ALARA procedures
- One open item
- One confirmatory item

Technical Topics of Interest, BLN COL

Radiation Protection Design Features

- Use of generic NEI template to fulfill operational program description for the Minimization of Contamination Program
- Criteria for radiological monitoring
- Onsite monitoring of groundwater
- Records of leaks and spills
- Radioactive liquid waste discharge pipe
- One open item and one confirmatory item

Technical Topics of Interest, BLN COL

Dose Assessment

- Use of program to minimize exposure to construction workers during Unit 4 construction.
  - Collective dose 1.13 person-rem
- One open item

Technical Topics of Interest, BLN COL

Health Physics Facilities Design

- Use of approved NEI template to fulfill operational program description for the Radiation Protection Program
- Clarification of implementation milestones
- One confirmatory item