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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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U.S. EPR SUBCOMMITTEE

TUESDAY

NOVEMBER 30, 2010

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ROCKVILLE, MARYLAND

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

SUBCOMMITTEE MEMBERS:

DANA A. POWERS, Chairman

JOHN W. STETKAR, Member

MICHAEL T. RYAN, Member

WILLIAM J. SHACK, Member

DESIGNATED FEDERAL OFFICIAL:

DEREK WIDMAYER

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

8:30 a.m.

CHAIRMAN POWERS: The meeting will now come to order. This is the meeting of the Advisory Committee on Reactor Safeguards U. S. EPR Subcommittee.

I'm Dana Powers Chairman of the Subcommittee

ACRS Members in attendance are Bill Shack, John Stetkar, Michael Ryan, Sanjoy Banerjee has begged off for this meeting for some purposes of university work.

The purpose of the meeting is to continue our review of the SER with open items for the design certification documents submitted by AREVA NP for the U.S. ERP design and the combined license application submitted by UniStar Energy for the Calvert Cliffs Nuclear Power Plan Unit 3.

So, if you are here to hear about BWR-type stuff which we don't discuss here, you belong next door. We are in the lesser room.

We will hear presentations and discuss Chapter 13 Conduct of Operations of the DCD SER, Chapter 10 Steam and Power Conversion Systems, Chapter 11 Radioactive Waste Management and Chapter 16

Technical Specifications of the Calvert Cliffs SER.

The Subcommittee will presentations by and hold discussions with representatives of AREVA NP, UniStar, the NRC staff and other interested persons regarding these matters.

The Subcommittee gathers information and plans to take the results of these reviews along with other reviews by the Subcommittee to the Full Committee at a Full Committee meeting.

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

We have received no requests from members of the public to speak at today's meeting. If you have something you think we should hear about, please get my attention and we will make time for you to talk.

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

The participants should first identify

themselves and speak with sufficient clarity and volume so they may be readily heard.

Copies of the meeting agenda and handouts are available in the back of the room.

A telephone bridge line has been established in the meeting room today and I understand we have participants from UniStar and AREVA NP on the line at various times throughout the meeting. We request the participants on the bridge line identify themselves when they speak and to keep the telephone on mute during times when they are just listening.

We also understand that the witty repartee and intense interrogations associated with this Subcommittee meeting have done grievous harm to Mr. Surinder Arora. So, that threat hanging over his head has incapacitated him and we are forced to turn to Jim Steckel and Getachew Tesfaye to give us some opening comments here.

MR. TESFAYE: Thanks, Mr. Chairman. Good morning, everyone.

My name is Getachew Tesfaye. I'm the NRC Project Manager for AREVA U.S. EPR Design Certification Project.

This morning, we'll continue our Phase 3 SERS presentation of the Staff Evaluation Report with

Open Items.

For the record, I'll briefly summarize our Phase 3 activities that have taken place to date. We have completed the Phase 2 presentation of ten chapters, presented Chapter 8 Electric Power and Chapter 2 Site Collector 6 on November 3, 2009 and Chapter 10 Steam Power Conversion System and Chapter 12 Radiation Protection on November 19, 2009.

On February 18 and 19, 2010, we presented Chapter 17 Quality Assurance and portions of Chapter 19 Probabilistic Risk Assessment and Severe Accident Evaluation.

On March 3, 2010, we presented Chapter 4 Reactor and Chapter 5 Reactor Cooling Systems and Connected Systems.

On April 6, 2010, we represented Chapter 11 Radioactive Waste Management and Chapter 16 Technical Specifications.

On April 8, we briefed the ACRS Full Committee on the seven chapters that were completed through March 2010.

On April 21, we completed the Chapter 19 presentation that was started earlier.

Also on April 21, 2010, we received a letter from the ACRS Full Committee Chairman on the

seven chapters that were completed through March 2010. The letter indicated that ACRS has not identified any issues that merit further discussion.

On May 27th, 2010, the staff submitted its reply to ACRS.

Today, as the Chairman --

CHAIRMAN POWERS: A harsh and weighty document.

MR. TESFAYE: As the Chairman mentioned today, we will present Chapter 13 Conduct of Operation. Please note that our presentation does not include Section 13.6 Security. Portions of that section that deal with cyber security and the like will be presented in other chapters.

Our current schedule calls for completing the Phase 3 presentation of the remaining eight chapters by mid-August 2011.

Mr. Chairman, that completes that prepared opening remark.

Thank you.

CHAIRMAN POWERS: Okay. Thank you. Now, we have a further casualty of the threat posed by this Committee in that Sandra Sloan has been scared away, frightened by the intense interrogation she would no doubt face and Darrell Gardner, I think you're

standing -- you're here in her place.

MR. GARDNER: Yes, sir.

CHAIRMAN POWERS: Do you want to give us some opening comments in her defense or her place should I say?

MR. GARDNER: Certainly. I'm Darrell Gardner from AREVA. I'm the Director of Licensing of U.S. EPR projects for AREVA. Sandra has other commitments today. Unfortunately can't be at two places at once.

CHAIRMAN POWERS: It's very suspicious that both she and Arora are gone from the Subcommittee. I think some interrogation will be called for the next time we gather here.

MR. GARDNER: Very good. We have a small team here today to present Chapter 13. Mr. Pedro Salas, Randy Ford and Mike Bonfiglio are our technical staff here in support and Pedro will primarily be our lead presenter today.

So, just again, our pleasure to be before the Subcommittee to get one more chapter out of the way on this journey through the process.

CHAIRMAN POWERS: But, still Sandra wouldn't show up. We're going to have to conspire to come up with something very obnoxious for Sandra to

vindicate in preparation for her next visit here. So, please help me identify some chore that will be particularly difficult for her to do. All right.

MR. SALAS: Your interrogation techniques, I made sure that I volunteer only for the only chapter that hardly has any material included. So, I know that that would limit the scope of your torture, but I'm sure you will lie in wait.

CHAIRMAN POWERS: Less we have to work with the more imaginative we get.

MR. SALAS: And fortunately, for me, you know, in the area that we have the most substantive, I'm, you know, happy to have Randy Ford in previous life and in the utility side was who I consider one of the top emergency planning managers in the country and that's been also a help to us on the vendor side. So, I'm very fortunate on that point. But, if I can have the next slide.

Again, the topics that we are here to present are 13.1, 13.2, 13.3, 4, 5 and 7 which covers the organizational structure, training, emergency planning, operational program implementation, plant procedures and fitness for duty.

The first one, organizational structure, that's an area that is reserved for the COL applicant.

So, not much to say there. I mean that's something that the applicant provides the information. Which is the COL item.

Next item. The next one is training. Again, the same thing. The training programs, that falls into the COL applicant's area of responsibility and their plan for implementation rests within that COL application. So, there's not much that is contained or we get that's certified in the design certification.

Emergency planning, here we do have an area where the design certification produces information although limited. First, we have a COL item for the applicant to provide the details of how he is going to implement the emergency plan. The details for the actual program itself, the decisions of how the program will be executed and all of the detail, that rests within the COL applicant.

What we do in the design certification is we ensure that we provide suitable space for the TSC that demonstrates that it will comply with regulatory requirements. In our case, that space it's provided in an area adjacent to the main control room and it is within the safeguards building. Because of that location, it also provides additional protection given

the shield building that we have.

Any questions on the --

MEMBER RYAN: Yes. How big is that space?

MR. FORD: It's part of an operational support area that's 46 by 66 feet. The TSC portion is dedicated 75 square feet per person in the area. That includes 20 for the TSC and five NRC persons.

MEMBER RYAN: So, it 75 square feet per person and what's the total square footage of that?

MR. FORD: I believe it's 1875 square feet. It's based on 20 utility and five NRC persons.

MEMBER STETKAR: Is that area supplied by the control room envelope, HVAC?

MR. FORD: Yes.

MEMBER STETKAR: There's no concern about -- if the control room is habitable, that room is habitable?

MR. FORD: That's correct.

ME. SALAS: Adjacent to each other will facilitate communications between the two locations.

MEMBER RYAN: Thanks.

MR. SALAS: If there are no additional questions, then we'll move to the occupational program implementation.

Again, the COL applicant will provide the

implementation details for the date and I will -- if you move to the next slide --

MEMBER RYAN: You might want to just push your microphones up a little bit because when you whack it with your paper, it's kind of like a cannon going off in his ears.

CHAIRMAN POWERS: And it's kind of fun to watch, but I do get yelled at about it.

MR. SALAS: First, we have the set of operational programs that are described in the FSAR. Actually, we introduce the material into tags and then the COL applicant will provide, you know, the implementation schedule for those programs and, you know, these are the sort of -- we actually did the -- took the description of the operational program and incorporated it into the FSAR sections and those sections are listed here for your convenience.

The next set of programs are the programs that both the description of the program and the implementation schedule are provided by the COL applicant. One thing that we did and we were one of the first early on to identify it is that the cyber security plan with the cyber security rule came up. We immediately noted that that needed to be an operational program. We added and included to the

design certification and that's the only -- one of the few developments that you will see from the time that it went to the Commission on the number of operational programs because that rule just did not exist at the time. But, we identified it. We included it. But, that actual description of that program will be provided by the COL applicant. Is provided by the COL applicant. The program itself.

MEMBER STETKAR: Pedro, this will give me a chance and the staff or anyone stop me if I'm treading in dangerous waters here.

The cyber security plan as you mentioned is strictly -- in the DCD, it's listed as strictly a COL applicant --

MR. SALAS: Right.

MEMBER STETKAR: -- responsibility. What elements -- be careful here. What elements of the cyber security plan in terms of hardware and software design that would affect protection against cyber intrusions are the responsibility of the DCD?

When I read through the description of that area in Section 13.6, I was led to believe -- it seems to say that the cyber security plan is the sole responsibility of the COL applicant and it seems to be an add-on if you will.

MR. SALAS: That's --

MEMBER STETKAR: Which traditionally has been the way it's been applied, but the Commission has a policy statement I believe, I think it's a policy statement, that says that security and safety should be integrated beginning at the design phase if at all possible.

So, I was curious how you address that and I was going to ask staff the same question. It's kind of into 13.6, but there could be elements of the hardware and software of your digital --

MR. SALAS: Yes.

MEMBER STETKAR: -- systems that could affect cyber security and I was curious how that split is actually resolved from the design going forward to the COL applicant who's responsible for the plan itself if you will.

MR. SALAS: Right. And I give you my thoughts and given how cyber security has evolved, I'm even going to discuss briefly the two. The document or the Reg Guide that provides the basis how COL applicants will be doing implementation of cyber security.

One thing that you find is that cyber security is heavily dependent on the -- and components

that you actually procure. Okay. Because they are -- one of the first elements that eventually will do is the identification of the critical digital asset, but the actual process that you will go through the -- either process that you pick is over a 148 decisions. It's heavily reliant on the manufacture of the details of the specific component that you end up procurement.

MEMBER STETKAR: Is it really?

MR. SALAS: Yes.

MEMBER STETKAR: It's dependent on the system architecture, but I'm not sure about whether you'd buy a chip set from Intel or AMD makes any difference about how you decide to protect intrusion into the --

MR. SALAS: Well --

MEMBER STETKAR: -- CPU that has that chip set plugged into it or whatever.

MR. SALAS: Right. At the COL level or after doing detail engineering, first, you will make decisions on which systems need to be in the highest level when you're completely isolated. So, you -- and I personally, just personal opinion, believe that you will find that most of the spots will end up being very isolated plants although they're nuclear power plants because that's just the easiest way to defend

and then the next level of details will be what are all the components that come in and out that can have a threat even before they arrive or that they are introduced while you are in the early phases of the constructions of operations.

MEMBER STETKAR: That part of it I -- okay. If that's what you're saying that the supplier specific side of the --

MR. SALAS: Right.

MEMBER STETKAR: -- cyber -- that I agree certainly.

MR. SALAS: We will do as a vendor those components like in our protection system that -- we will do that portion of the work and we will do a very equivalent work to what we would do if you're buying another piece of safety-related equipment for which we would go out and procure whether it is, you know, transmitters or something else that may have chips in them.

The number of the decisions on each one of -- I mean for each component will be -- a COL applicant will have to go in and analyze all those controls. Some of those controls will require questioning how the vendor did the initial manufacturing and insuring that it doesn't have any

malware while it is constructed.

The assessment will also have to determine what are the possibilities given that its location and the people access -- what kind of access individuals may have to that component. May have to put additional controls depending on where it is located, the access, how many systems does it communicate with, is it relying on information that may be coming from outside the plant and then understanding all the pieces of hardware that are procured. It is going to be complicated and --

MEMBER STETKAR: You're focusing on kind of the hardware and insuring that if I'm the COL applicant that the hardware that I receive doesn't have any imbedded threats in it.

MR. SALAS: Right.

MEMBER STETKAR: And any vendor supplied software.

I'm more concerned about protection against intrusion from external cyber attacks and that has to do more with the architecture of the basis system, the information flows, the communications. Which is not part of the hardware. That's part of the basic design architecture of those digital systems.

So, in terms of designing a system to be

resistant to external intrusions, that's a design function. That's nothing --

MR. SALAS: Correct.

MEMBER STETKAR: -- that the COL applicant can do once they inherit the system design.

MR. SALAS: You're right. Many of those details though will occur during detail engineering because the detail of actually how your wiring, what kind of filter systems you will put, that will occur at a stage beyond, you know, the one that we are right now .

Now, one thing that I will tell you is that the Reg Guide that the Commission has issued very tight controls as to which systems have to be located in level 4 which is the highest level with one-way communication and what you would find is that except for emergency planning where, you know, you may have phones and that, you know, you have to be able to communicate with the outside world. Okay. You have to be able to send data to the NRC as part of -- I mean there are things that dictate that there be levels of communications with the outside world.

Those will be handled separately, but you will find that even the Reg Guide and I think rightly so establishes the majority of the system whether it

is safety related or non-safety related be located in the highest level of protection and, in fact, at one time, even myself, I started stating I can't think of any system that fall into what is called level 3 because the majority is level 4. I didn't say -- why do we even have a level 3 because the majority of the systems eventually I expect will reside in level 4.

It's not a decision that occurs at the design certification level because it is at the latter stages when you end up putting all of the details of how you will wire together the different systems, what kind of firewall it takes and the actual -- some of it I think is going to be depending on the manufacturing of the -- even though the firewalls that you may put in in order to ensure that this is a one-way communication and given the strength of the robustness that you believe those components have may dictate whether or not you need to disconnect certain things and then connect them.

Those details will be, I think, heavily dependent on the manufacturing and the capabilities of the hardware that you are able to find when you make a decision to procure it.

But, either it will be within the COL -- at the time, it won't be an application. It will be

the actual -- a COL will exist that those decisions will be made and we have shared, you know, in COL discussions how, you know, most of the vendors -- most of the applicants have intended to have compliance with those industry guidelines which put most of the components at the highest level, but other than emergency planning.

So, I think that there's a logic why you would put it there because there's so much dependency on the hardware when you end up making the decisions. The details will vary and I think will evolve as new threats also come up. So, if you were to put it on the design certification, you're probably also freezing time. Something that will continue to --

MEMBER STETKAR: Well, but I mean there's certain areas of the design that are certified as part of certified design with details left up --

MR. SALAS: Yes.

MEMBER STETKAR: -- to, you know, the COL applicant. So, that's not an unusual split.

MR. SALAS: No.

MEMBER STETKAR: It's just that this happens to be one where essentially the whole responsibility is --

MR. SALAS: Right.

MEMBER STETKAR: -- pushed to the COL applicant.

MR. SALAS: Like I said, in the case of our, the protection system, eventually we as vendors when the COL holder at that time goes through the analysis of that critical digital asset, they will provide all of the testing data that we provide just like the other vendor will.

MEMBER STETKAR: Yes.

MR. SALAS: And we will provide all that information and it will go into the analysis and --

MEMBER STETKAR: Yes, but at that time, you're simply an equipment vendor.

MR. SALAS: Yes.

MEMBER STETKAR: In a sense.

MR. SALAS: Correct. That is correct.

MEMBER STETKAR: Okay. Thank you.

MR. SALAS: If I can have the next slide. The next one is again plant procedures.

Plant procedures is an area where actual implementation again falls within the Applicant and at that time, it will be actually during the -- the Applicant will describe the program, the actual implementation of the procedures. Similar to what happens in cyber security.

The detail -- think about all the detail that goes into procedures. You need a lot of the information on the procurement specs of the system that you have actually obtained. So, all of those details are -- you know, you will have a program description at the COL application level, but then the details will actually come in much later during the -- any questions?

MEMBER STETKAR: How far do you go in terms of -- your sub-bullet there regarding emergency operating procedures indicates that you supply a technical basis document. So, you have the technical basis.

Do you also supply a shell of the emergency procedures themselves? You know, actual step-by-step procedures. Recognizing, of course, that eventually the COL applicant will have to fill in specific set points and, you know, criteria and references perhaps to specific instruments, but --

MR. SALAS: Correct me if I'm wrong. Yes, we do that, but we actually do that in support of the COL.

MEMBER STETKAR: Okay.

MR. SALAS: Our product, we would do it if you were supporting the COL applicant's needs.

MEMBER STETKAR: But, as far as the design certification, it basically ends at the technical basis document for the --

MR. SALAS: Right. Okay.

MEMBER STETKAR: Thank you.

MR. SALAS: And again, the only section that we touch in security is the fact that the fitness for duty requirements will be supplied -- will be provided by the COL applicant via the physical security plan.

And with that, see I told you I was hoping that this would be easy and I would be able to survive your interrogation.

MEMBER STETKAR: That was only our usual questions on that.

CHAIRMAN POWERS: I don't know. We're getting old I guess, but --

MEMBER STETKAR: If you'd let me talk about 13.6, it would have gotten more difficult.

CHAIRMAN POWERS: But, I won't let you talk about -- I know 6. You make it more difficult.

MEMBER STETKAR: I know you won't.

CHAIRMAN POWERS: We still have this open item on what to do about Sandra. So, I'll wait for your comments later in the day, but we need something

really obnoxious for her.

The Members, do you have any other questions on this section? Correctly stated most of this belongs to the applicant who will buy this fine machine and deep down have created the structure for him to start. The heavy lifting is on his shoulders.

Okay. Well, we'll turn to the staff now.

MR. TESFAYE: Mr. Chairman, Mike Miernicki who will be Chapter PM for Chapter 13 and he has very difficult chapters.

CHAIRMAN POWERS: He carries the heavy lifting here. A long oar in the water here on this one.

MR. MIERNICKI: I'll be back.

CHAIRMAN POWERS: You should be thanking me that I have deferred 13.6 as this man is plunging at the bit here.

MR. TESFAYE: Appreciate that. Mike, take it from here.

MR. MIERNICKI: Okay. Good morning.

As Getachew said, I'm the Chapter PM for Chapter 13, the EPR. This is the staff's presentation on conduct of operations.

With me this morning to assist in the presentation, two members of the staff. We have Tony

Bowers who is an Emergency Preparedness Specialist in the Emergency Preparedness New Reactor Licensing Branch and also, Rick Pelton who's a Training and Assessment Specialist in the Operator Licensing and Human Performance Branch.

Okay. Flip to the next slide.

The list, Rick and Tony and all the other who assisted in this review are listed in the next couple of slides. Okay.

Moving along to slide number 4, this is a table that's an overview of the staff's review of the FSAR listed by section. We have the FSAR sections, the numbers of questions and the numbers of open items where the staff is.

You can see the bulk of the questions were under physical security which we won't be discussing today and also, the three open items are also associated with physical security. Okay.

With respect to the technical topics of interest, we've grouped those sections based on the cognizant review branch. So, the first group which is the organizational structure of the applicant training and plant procedures will be covered by Rich Pelton.

MR. PELTON: Good morning. I'm Rick Pelton and I was part of the team that reviewed

Sections 13.1, 13.2 and 13.5.

All three -- none of the sections have any open items as Mike pointed out earlier.

All three sections have COL information items associated with them and the staff agrees that the information items are the responsibility of the COL applicant and are appropriate to meet the criteria of the Standard Review Plan.

CHAIRMAN POWERS: Good morning. I mean it does seem like -- it seems like the staff's come to a conclusion that any agreement with what the designer has come to -- the question that always comes up to my mind is is there enough guidance provided somewhere probably not in the DCD, but somewhere to tell us what peculiarities of this plant need to be addressed in any of these items. But, for instance, is there any peculiarly in the plant that requires uniqueness in the organizational structure? I don't know that there is, but how do we know that there isn't?

MR. PELTON: A good question because we didn't notice in our reviews any --

CHAIRMAN POWERS: I mean --

MR. PELTON: I mean it's --

CHAIRMAN POWERS: I have nothing specific in mind and I can't think of anything, but you guys

are smarter than me and so, maybe you thought of something.

MR. PELTON: We didn't find anything out of the ordinary in this design certification application.

CHAIRMAN POWERS: I mean this is probably the one least likely to have anything unusual --

MR. PELTON: Um-hum.

CHAIRMAN POWERS: -- of all the new plants I can think of. Okay. Tony.

MR. BOWERS: Good morning.

MEMBER STETKAR: Let me ask. Kind of following up on that, do you -- AREVA said that as part of the DCD they developed the technical basis document. Technical basis documents or whatever you want to call them for the emergency operating procedures.

Do you actually review those documents or if not, under Chapter 13, are they examined by the staff anywhere to gain confidence that indeed they're of reasonable scope and there are -- you know, as Dr. Powers said, this is a large pressurized water reactor, but it does have some different design features that might merit special consideration for emergency operating procedures or guidance to

operators.

When and where are the documents reviewed?

MR. PELTON: The documents related to specifically to the EOPs and the remaining procedures will all be inspected by the staff for each applicant, each COL applicant, prior to -- I think --

MEMBER STETKAR: Okay. So --

MR. PELTON: -- that it's three months prior to the start of licensed operator training.

MEMBER STETKAR: So, the --

MR. PELTON: Will be in place.

MEMBER STETKAR: Okay.

MR. PELTON: And during that time is when we'll be doing an inspection to look at the basis documents and then the procedures to make sure that they're following the appropriate human factors guidelines and they're technically accurate and --

MEMBER STETKAR: Yes. So, despite the fact the basis documents are developed, are they docketed as part of the design -- the certified design?

MR. PELTON: Don't know. Are they?

CHAIRMAN POWERS: They wouldn't be part of the certified design.

MR. PELTON: I don't think they're part of

the certified design.

MEMBER STETKAR: Okay.

MR. PELTON: They're available. They're public documents.

MEMBER STETKAR: Okay. Okay. Okay. Thank you.

CHAIRMAN POWERS: My perception on this plant is that we have a plant here that's designed to do quite a lot of inservice maintenance and things like that. Which is the only real unique feature of the plant that comes to mind.

It's very difficult for me to see how that translates into anything that would show up as a unique feature here.

Is there something I'm missing?

MR. PELTON: Apparently not or you would have said something to me about it.

CHAIRMAN POWERS: Right. Right. Tony. We'll get to you eventually, Tony?

MR. BOWERS: No problem. Good morning. My name is Anthony Bowers. I'm an EP Reviewer for the U.S. EPR DCD Section 13.3 Emergency Planning.

The staff performed its review of the EPR FSAR Chapter 13.3 Emergency Planning pursuant to the guidance in the Standard Review Plan NUREG 0800. The

results of the staff's review are as follows.

Currently, we have no open items, no confirmatory actions. Which means there is no additional information expected to be incorporated into the FSAR at this time.

The applicant proposed COL information item 13.3-1 which states COL applicant that references the U.S. EPR design certification will provide an emergency plan, site specific in accordance with 10 CFR 50.47 and Appendix E to 10 CFR Part 50.

The staff's evaluation of the applicant's FSAR Section 13.3 concludes that the proposed space for the TSC in consideration of location and size is acceptable since it meets the endorsed guidance in NUREG 0696 which is functional criteria for emergency response facilities as well as the Planning Standard 5047(b)(8) in Appendix E4 E8 to 10 CFR Part 50.

Staff finds the location of the TSC acceptable since it's located within the integrated operations area in the safeguards building which is designed as a seismic Category 1 facility. The TSC is within the control room envelope adjacent to the control room and maintains the same habitability as the control room during normal, off-normal and emergency conditions. This location of the TSC will

facilitate face-to-face interaction between control room personnel and TSC technical staff.

The staff finds the size of the TSC acceptable since it's designed to accommodate at a minimum working space for 25 personnel which is 20 predesignated licensee personnel as well as five NRC personnel and space suitable for data system equipment and record storage.

In addition, the SRP, the Standard Review Plan, identifies interface areas in which the staff verified various TSC capabilities are being addressed based on the information provided in Section 13.3 of the FSAR.

TSC habitability is addressed in SER Section 6.4 with additional dose analysis in Section 15.0.3. TSC ventilation and AC is addressed in SER Section 9.4.1 and TSC voice and data for support of emergency response operations is addressed in Section 7.1, 7.5 and Section 9.5.2.

MEMBER STETKAR: Since we're well ahead of schedule and somebody has to give you a hard time, I'm --

MR. BOWERS: Okay.

MEMBER STETKAR: -- curious about the space available and you said a word that reminded me

that I need to ask this. You said that the space is adequate for the -- to support the minimum number of people. I think the applicant stated that the space, the 75 square feet per person and the complement, is 25 people which works out to 1875 square feet.

Is the minimum or is that the maximum complement that can be supported by that space?

MR. BOWERS: That's the minimum.

MEMBER STETKAR: So, I can put 200 people in that space and it's still adequate?

MR. BOWERS: No.

MEMBER STETKAR: So, how many people can I put in that space and still meet the guidelines? Given the fact that the walls are probably pretty fixed. So, I have 1874 square feet.

MR. SALAS: It's designed for 25 people.

MEMBER STETKAR: Okay. So, that would be the maximum then?

MR. BOWERS: Right.

MEMBER STETKAR: Okay. Thanks. This comes up when you say well, it's the minium number of people that can be supported. If I'm concerned about emergency planning and indeed I have space and habitability requirements that are designed for 25 people and suddenly, you know, a complement of 20 or

30 additional people just because they think it's the good thing to do want to come up, I'd better make sure that they can't.

So, that differentiation between minimum and maximum although it sounds really petty can indeed have implications about how you control who actually mans --

CHAIRMAN POWERS: This is all one of the TMI --

MEMBER STETKAR: -- that.

CHAIRMAN POWERS: -- lessons learned rules where --

MEMBER STETKAR: Yes.

CHAIRMAN POWERS: -- we had 63 people in the control room at various stages.

MEMBER STETKAR: Right.

CHAIRMAN POWERS: And things like that and they clearly have taken those lessons to heart. Now, one of the questions that comes to mind is whereas, the TSC does facilitate interactions between the support personnel and the operators, it also facilitates that interaction that is both a help and a distraction depending what goes on and I take it it's just part of the design philosophy. That they want close interactions there rather than remote

interactions there which some of our existing plants --

MEMBER STETKAR: Actually, the good thing about this design is that the TSC is designed to be in close proximity, but outside of the control room. So, other designs that we've looked at have a more remotely located TSC that are susceptible to possible habitability concerns that might require relocation of people from the TSC to somewhere in closer proximity to the control room which then raises other concerns that you mentioned about distractions for operators. Here at least, although there's always that potential for distraction, at least -- as long as the control room is habitable, the TSC will be habitable and --

CHAIRMAN POWERS: And everybody has their own space.

MEMBER STETKAR: And everybody has their own space. Under extenuating circumstances, you don't have some small group of people suddenly deciding that they need to camp out in the middle of the control room floor or something like that.

CHAIRMAN POWERS: And that, of course, is forbidden by rule now.

MEMBER STETKAR: Yes.

CHAIRMAN POWERS: So, that's not going to

happen I don't think.

Well, I mean all it says is that when you have your TSC located in close proximity, you've got a different set of procedures and disciplines and operations than you do when you have it remotely located and it's something to take into account in the design. Fair enough.

MR. MIERNICKI: Okay. Then moving on to the next slide, the last two sections described in the FSAR are 13.4 which is the operational program implementation and 13.7 which is fitness for duty and as listed on that table earlier, there's no open items in these sections.

The operational programs listed in the FSAR are consistent with the SECY guidance of programs that are identified.

Also, it's consistent with 10 CFR 73.54, the cyber security regulation to list that cyber security plan as an operational program.

As identified in the FSAR, all of these operational programs will be addressed by the COL applicant and for the remaining item, fitness for duty, the staff agrees that the fitness for duty program is also a COL item and the applicant's responsibility and it's appropriate to have that COL

item in accordance with 10 CFR Part 26, fitness for duty programs.

Any questions?

MEMBER STETKAR: I'll ask you the same question. Where does the staff consider possible design related issues that may affect the cyber security plan? And in particular, you heard the discussion with the applicant. In particular, the architecture of the digital systems, communications among different elements of the digital system safety systems versus non-safety systems versus potential off-site communications and so forth.

Where the identification of critical -- this process of identifying critical digital assets which is a key element of the whole cyber security plan is not necessary solely a COL applicant issue. I mean at that point, it becomes rather obvious, but there could be elements of the fundamental design that could affect the ease of implement if you will of a particular cyber security plan.

So, I was curious where or does the staff actually examine the design from that perspective?

MR. TESFAYE: Yes, we do. As a matter of fact, we have a person here who can talk about that.

MS. ZHANG: Hi.

MR. TESFAYE: This is a Chapter 7, you know --

MEMBER STETKAR: That's what I thought you were going to say. So.

MR. TESFAYE: We're ready for that.

MS. ZHANG: So, I would just like to first clarify the -- oh, my name is Deanna Zhang. I am a Chapter 7 reviewer and also review Section 9524. It was communications.

I would first like to clarify the FSAR 73.54 rule. That is a programmatic-based rule and it only sets a requirement on the licensee.

So, it's a performance-based rule which means that it is up to the licensee to demonstrate how they meet the rule and in that case, it's actually -- you know, we don't review the design, but the licensee has to demonstrate the design for the cyber security requirements and so, they need to provide procurement specifications that ensures that the products delivered are secure, that they can be protected, have the right design controls to protect against a cyber attack.

So, 571 in their Section 12 provides the guidance for acquisition and for them to implement or

to put on their vendors and this includes examining the software, examining the architecture to ensure there's no vulnerabilities in the architecture, to ensure that there's no hidden code in the software. Includes some white box testing, black box testing. That type of thing.

MEMBER STETKAR: And, in fact, the applicant tended to emphasize those same issues which is vendor-supplied hardware and software. Insuring that what I receive from the vendor does not have any hidden malware or vulnerabilities.

I'm more concerned about just the basic architecture of the digital systems. The basic design, the communications architecture.

Given the architecture and the design, one can fulfil those design requirements with any number of boxes of electronics and software. There may be elements of the design that are more or less vulnerable to external attacks depending on the configuration of that particular design. That's what I'm focusing on.

So, I'm not focusing on the assurance that the improvement --

MS. ZHANG: And that's the defense-in-depth levels that we had provided as guidance that

should be implemented and it goes beyond that. There's over 40 -- you can concern -- design controls that should be implemented to protect the plant against a cyber attack.

MEMBER STETKAR: Yes. We've -- okay. Where are those levels of defense in depth in the design review? Is that postponed completely to the COL review? At which point, the COL applicant has essentially not control over the design. They cannot control the basic design and architecture of those digital systems. They are already part of the certified design.

So, now, given the design as a COL applicant, I need perhaps to develop some fairly creative solutions to a problem that perhaps could have been solved at the design stage had the design been sensitive to both safety and security in an integrated sense rather than saying we'll build a very, very good design for plant safety and then let the COL applicant worry about cyber security. Which seems to be the philosophy here and --

MS. ZHANG: Well, would be -- yes.

MEMBER STETKAR: -- I'm concerned about that.

MS. ZHANG: Yes, I do recognize. I think

the sense is not that there won't be design -- cyber security designed into the systems that are delivered.

It's that we don't review the design. That is between the COL applicant and the vendors to work out on an early stage and we definitely encourage that.

We expect that their overall design meets our cyber security requirements during the inspection stage. So.

MEMBER STETKAR: But, that's strictly an inspection function at --

MS. ZHANG: It's strictly inspection stage.

MEMBER STETKAR: -- after the COL is issued.

MS. ZHANG: After the COL is issued, but we do encourage that the COL -- in order to comply with the cyber security rule, that they meet with their vendors early and start from the design stage.

MEMBER STETKAR: But, that's only an encouragement. As you mentioned --

MS. ZHANG: Well --

MEMBER STETKAR: -- there's no formal staff review done to examine the design architecture.

MS. ZHANG: That is how the rule --

MEMBER STETKAR: Certainly not in Chapter 13.

MS. ZHANG: Yes. Yes, that's how the rule is written. So.

MEMBER STETKAR: Yes.

MS. ZHANG: We're restricted by that then.

MEMBER STETKAR: Not necessarily restricted by the way the rule is written. Because it's also Commission policy that says the design of safety and security should be integrated.

MS. ZHANG: Actually, we will be -- we have a Reg Guide coming up 1152 and we will be discussing this in detail.

MEMBER STETKAR: We've seen a draft.

MS. ZHANG: Yes.

MEMBER STETKAR: I know the Subcommittee of the ACRS has seen drafts of that and has made --

MS. ZHANG: Yes.

MEMBER STETKAR: -- preliminary comments. So.

MS. ZHANG: So, we do expect to go into this in detail during that presentation.

MEMBER STETKAR: Okay. Okay. All right. Thank you.

MR. TESFAYE: This is a very good introduction for Chapter 7 Communication.

MEMBER STETKAR: You'll hear some of that on Chapter 7, but --

CHAIRMAN POWERS: Chapter 7 will be different than this particular meeting.

MR. MIERNICKI: Okay. Moving along. In conclusion, except for the open items listed above which are all listed in 13.6 which were not discussed, the staff concludes that Chapter 13 of the EPR FSAR is acceptable and in accordance with applicable regulations. Any questions? Any further questions?

CHAIRMAN POWERS: Members have any comments on this conclusion? I suspect the Subcommittee will recommend to the Full Committee that we agree with your conclusions save the 13.6.

MR. MIERNICKI: Thank you.

CHAIRMAN POWERS: And I actually struggle with can you get this one concluded leaving 13.6. The usual thing.

MR. WIDMAYER: I think that's what you're required to do.

CHAIRMAN POWERS: Yes, that's the statement. So, I think we write a letter that says save for 13.6 Physical Security we're happy with this.

Because there are no open items, I mean we ought to get this off our list just as quickly as we can just to make life easier for other people.

At this point, we're going to switch to primarily issues it says here with the reference COLA Application and Greg assures that none of his team was intimated by this Committee. They all showed up.

We will let him be. Joe, are you going to introduce things for us here?

MR. COLACCINO: Yes, sir, Dr. Powers. Good morning, everybody.

My name is Joe Colaccino. I'm the Chief of the EPR Projects Branch.

Surinder Arora, the Lead Project Manager, is unable to be here today. So, just give you a 30-second brief from where we are. The staff's review of the Calvert Cliffs Reference Confined License Application.

The first chapter that I'm talking about today is 3 of course. The first chapter that came was Chapter 8 back in February. Subsequent to that, we had Chapters 4, 5, 12 and 17 that came in April of this year and then in May, we had Chapter 19. So, those are all the chapters that come forward so far.

Today, we're going to give you three

chapters and the applicant is very anxious to talk to you about those things for the remainder of the day. Those would be Chapters 10, 11 and 16. So.

CHAIRMAN POWERS: We're only going to give him until 2:25.

MR. COLACCINO: I understand that. But, they would like --

CHAIRMAN POWERS: So, he can be anxious -- but, we're going to boot him out at 2:25.

MR. COLACCINO: Okay. So, anyways, with that, I'll turn it back over to the Committee.

CHAIRMAN POWERS: Greg, welcome back.

MR. GIBSON: Dr. Powers.

CHAIRMAN POWERS: Like I say, I'm glad none of your team was intimidated by the witty repartee and intense interrogation posed by this Subcommittee. So, I'll let you take the floor now.

MR. GIBSON: Thank you very much, Mr. Chairman.

Again, I'm Greg Gibson, Vice President of Regulatory Affairs for UniStar Nuclear Energy.

I want to thank the Committee for seeing us again. We will be finishing three chapters today. Ten on steam supply, 11 on rad waste and 16 on tech specs and with that, at the conclusion, we'll be

halfway through our 18 chapters of the Combined Operating License Application.

Today, we'll have our first presentation on Chapter and the next slide, as you recall from our previous presentations, the Calvert Cliff referenced COLA has been constructed using the incorporate by reference strategy.

Within that, we will be presenting in the referenced COLA only supplemental information or site specific information that's unique to Calvert Cliffs and any exemptions or departures from the design certification for the U.S. EPR.

Today's presentation was put together by a large group and we have the honor of having Mark Finley who spoken with you previously. He is an engineering manager and he's going to be presenting Chapter 10 to you and we will be focusing on the site-specific aspects of our application.

Mark.

MR. FINLEY: Yes, thank you, Greg.

As Greg said, my name is Mark Finley. I've been with UniStar for four years now. Before that, with Constellation for 22 years. Three years at the Ginna Plant and 19 years at Calvert Cliffs. So, I think I'm in the right room regarding pressurized

water reactors.

CHAIRMAN POWERS: Yes, none of that stuff for you, boy.

MR. FINLEY: And before that, seven years Nuclear Navy and a Bachelor of Science from Naval Academy, professional engineer's license from the State of Maryland.

So, slide 4 now shows a listing of the COL items that I'll be discussing today and you can see it's a relatively short list. We have incorporated by reference the remaining portions of Chapter 10. So, these are the items of site-specific interest.

If you flip to slide 5, I'll start by discussing the turbine generator. We have selected a supplier for the turbine generator. It is Alstom. Alstom has a good track record in terms of performance. They have designed and built and installed, tested the largest nuclear turbine prior to the EPR. Those at the N4 series plants in France. Roughly -- nearly 1600 megawatt output. Our's is a little larger than that, but it's an incremental change in the output of the turbine.

Alstom has a disciplined approached to design. To manage that incremental process, of course, those machines operated at 50 hertz or 1500

RPM. Our's is 60 hertz and 1800 RPM.

Alstom has had no catastrophic blade failures in a nuclear application. So, that's obviously important to us.

CHAIRMAN POWERS: How about in non-nuclear applications?

MR. FINLEY: I'm sorry.

CHAIRMAN POWERS: How about in non-nuclear applications?

MR. FINLEY: I'm not aware. Well, I could ask Alstom to comment. The question is have we had failures in non-nuclear applications?

MR. PESCH: Guenter Pesch, Project Director from Alstom. I worked for Alstom for 20 years. I'm a Commissioning Engineer and Project Management.

Non-nuclear fossil applications, there has been -- there have been incidents with missile release, blade release. It has happened. Various reasons.

I think we have a very good track record with the specific issue of stress corrosion cracking. I'm not aware that we actually had a blade failure due to that for the last 20 years, but I cannot go through all the units. It's just from my record.

Nuclear, there hasn't been any nuclear applications. Nuclear applications are considered small blades in general because of the half-speed design.

MEMBER STETKAR: You mentioned the stress corrosion cracking has not been an issue. Could you give us some examples of the root causes for the events that you have experienced in the non-nuclear class?

MR. FINLEY: He may not have that information readily available.

MR. PESCH: Yes, I can -- yes, very -- I mean we will be able to provide you certain examples.

Sometimes the root cause is a disputed issue, of course. It's not always agreed what the root cause is. Is it an operational back pressure? Is it operating out of a vibration, a range for a long time? Is it transient operation? And so forth. Most of the time it is a dispute in that area I would say.

MEMBER STETKAR: I think it would just be interesting to see what some of the experience has been. Obviously, you know, the specific turbine design is a little bit different. The size, but that being said, turbines are turbines. Turbine protection systems are turbine protection systems and it would be

interesting to see what -- if we could, to see a little bit of that operating experience to see --

MR. PESCH: Well, it's a --

CHAIRMAN POWERS: I mean I don't want to go exploring issues that really are a -- I mean it's Greg's headache. It doesn't include as a safety issue, the public.

So, unless we can find a track that leads to the public on this --

MEMBER STETKAR: We'll get to it. Turbine missiles.

MEMBER SHACK: I mean he has to meet a certain probability.

MEMBER STETKAR: You got to meet a certain probability for failure to eject a turbine missile and operating experience is relevant to the estimation of that frequency.

CHAIRMAN POWERS: And a blade ain't going to do it. You got to break a rotor.

MEMBER STETKAR: Okay.

CHAIRMAN POWERS: Okay.

MR. FINLEY: Still on slide 5, we will submit -- during the fabrication process, we will submit test data, material specimen data, et cetera for the turbine disk rotor and lading and the testing

that we do. We've committed to that.

In terms of an inspection program, there is a ten year inspection program for the rotor and the blades. Essentially, coincident with the ten year ISI schedule for the plant we plan to do the high pressure, intermediate pressure rotor during the ten-year ISI inspection itself and then the LP rotors sort of alternating during outages in between the ten-year ISI plan. So, each rotor would be inspected on a ten-year interval.

CHAIRMAN POWERS: Is there hydrogen associated with this system?

MR. FINLEY: Is there hydrogen associated? Not with this. Not with the turbine itself, but, of course, with the main generator, yes. Yes.

CHAIRMAN POWERS: And we'll explore your hydrogen safety as part of the fire?

MR. FINLEY: I'm sorry.

CHAIRMAN POWERS: We'll look at hydrogen safety with the affect of fire?

MR. FINLEY: Certainly. Yes, certainly, the hydrogen content in the main generator is fed into the fire protection analysis for the turbines. Yes.

MEMBER SHACK: Those ten-year inspections, that's an ASME requirement. Does Alstom have it's own

independent?

MR. FINELY: Let me ask Alstom for the answer.

MEMBER SHACK: Their warranty or whatever it is you get.

MR. FINLEY: The question is does Alstom have a ten-year inspection requirement?

MR. BUTZ: My name is Rudolf Butz with Alstom Power and I'm the Project Engineering Manager and we have an inspection program which is compliant with ASME, with the standards. So, it's a -- we have included our --

MEMBER SHACK: You're consistent with it.

MR. BUTZ: We are consistent. Yes.

MR. FINLEY: Other questions on the turbine?

CHAIRMAN POWERS: You said that these Alstom units are used for the N4 plants. Have any of those operated long enough to go to a ten-year inspection yet?

MR. FINLEY: Yes, I believe so. The first of the N4 plants I believe came on in late 1990s. For Alstom, do we have any feedback from the ten-year inspector and 1st and 4 plant?

We don't have feedback here today. We can

get that to you.

CHAIRMAN POWERS: Yes. It's just interesting and --

MR. FINLEY: I can tell you there's nothing significant that sticks out from the inspection that we're aware of, but we can take an action to find out.

CHAIRMAN POWERS: Thank you.

MR. FINLEY: Okay. If there are no other questions on turbine, I'll move to slide 6 and slide 6 discusses the flow accelerated corrosion program and, of course, we are committed to develop and implement a flow accelerated corrosion program for the plant. This would be prior to initial fuel loading at the site.

Of course, elements of that program need to be in place earlier than that in the design process. Our program will be consistent with the industry practices as outlined in the documents there you see in front of you. Generic letter from the NRC and also the EPRI NSAC document. Both EDF and Constellation have a tremendous amount of experience operating plants in similar environments and so, we'll bring that experience to the design process.

We'll make conservative choices regarding

materials in the design process and that's the element that needs to be in place early on.

CHAIRMAN POWERS: Aren't you getting rid of flow accelerated corrosion likely by material selection?

MR. FINLEY: Material selection is one of the most important elements of eliminating -- to the extent possible eliminating flow accelerated corrosion. Yes. Yes.

We intend to be conservative in that process.

MEMBER SHACK: Yes, do you have experience -- I mean the materials recommended is a .1 chrome minimum and it's a carbon steel. It's going to have something like a .4 chrome max.

Do you have experience with those materials?

MR. FINLEY: I can tell you that those are considered minimums by us right now. We're looking at a higher content of chrome and it's EDF's practice, in fact, to use a slightly higher content. One percent chrome minimum.

So, that's what we're going to be considering even up and above what's documented in the FSAR right now.

And, of course, that's not for all applications.

MEMBER SHACK: Right.

MR. FINLEY: There will be certain applications where two-phase flow and high temperatures are predominate where we would look at using stainless steel. So, you know, it's a function of the environment.

MEMBER SHACK: Now, when you change the material, that's not an adoption by reference. Right?

MR. FINLEY: I'm sorry. Say that again. Didn't understand.

MEMBER SHACK: The material called out in the DCD is the .1 chrome minimum. I guess 1 percent chrome, but it's a carbon steel. The 1 percent chrome won't be a carbon steel anymore.

MR. FINLEY: That's correct. That's correct. I mean we intend to use a low alloy --

MEMBER SHACK: Steel.

MR. FINLEY: -- steel. In addition, we may use higher alloys of say a stainless steel in certain applications as well.

MEMBER SHACK: Okay. I just wonder how that is reflected from DCD which calls carbon steels.

MR. FINLEY: I'm not sure I follow. I'm

not sure I follow the question.

MR. GIBSON: It would be a licensing issue if we decided to take a --

MEMBER STETKAR: You would have to take an exception to the --

MR. GIBSON: -- an exception.

MEMBER SHACK: Yes, I don't know whether that's --

MR. GIBSON: Even if it's post-COL, we would come in with a license amendment to do that. I think your question is the selection of all the materials throughout have not been completed yet. Is that --

MR. FINLEY: Right. No, we have not made the selections of materials. It's a process that's ongoing. Certainly, we would take into account the licensing ramifications if there was a need for departure from the design specification.

MEMBER SHACK: But, I mean that is a departure. Right? I mean or is that something you can do under a 50.59 like process? I mean I think most people would agree it's an improvement.

MR. GIBSON: Yes, we do have a procedure in process, in place to do evaluations for just that and we would then do the technical and economic

evaluation. Technical aspects would be evaluated and licensing as to whether or not if it was post-COL whether we would need a license amendment or whether it could be done under a 50.59-like process which we do have a procedure for.

MR. FINLEY: If no other questions on flow accelerated corrosion, I'll move to slide 7 and here we speak about the main condenser and first, the design pressure. Design pressure is 150 pounds. Test pressure of 225 pounds, 1.5 times that. Condenser materials, we have some experience with this at the existing Calvert Cliffs units. We intend to use titanium tubes in the main condenser and to clad the tube sheet with titanium as well.

Waterboxes will be carbon steel, but lined with a material that's compatible with the brackish water from the Chesapeake Bay.

Expansion drawings would be some sort of elastomer. Again, compatible with the brackish water at --

MEMBER STETKAR: And you're not cleaning up that water. You're just -- the make-up water to the cooling tower is direct bay water?

MR. FINLEY: Actually, we'll talk about that at the next slide if I can --

MEMBER STETKAR: Okay.

MR. FINLEY: -- ask you to hold your --

MEMBER STETKAR: Sure. Sure.

MR. FINLEY: -- question.

MEMBER STETKAR: Sure.

MR. FINLEY: In fact, slide 8 shows the general layout of the circulating water system. First of all, it is a closed system basically except for the make-up as you ask about. Basically, we use the brackish water from the Bay to fill the system, but other than that, it's a closed system with a cooling tower. It is a forced draft mechanical type cooling tower. We will have four circulating water pumps. Basically, 25 percent pumps, around 200,000 gallons per minutes. So, total of 800,000 gallons per minute flowing through the condenser.

It's a multi-pressure condenser. Multi-stage condenser. So, three passes through the condenser. Successively higher pressure in the boxes with the condenser.

For make-up, we do have make-up from the Chesapeake Bay. Sir.

MEMBER STETKAR: I think make-up is on your next slide.

MR. FINLEY: Yes. I just wanted to point

it out on this slide. You see there is a make-up intake structure and I'll talk about that. We do about 40,000 gallons per minute make-up from the Chesapeake Bay.

The next slide as you say, slide 9 --

MEMBER STETKAR: Let me backtrack to the basic circulator. I had a few questions. If you could go back to the drawing so that --

MR. FINLEY: Okay. Slide 8 please.

MEMBER STETKAR: There. Yes. You mention that you have four 25 percent capacity circ water pumps. That implies that all four of them will be running during power operation. If I trip one of those pumps, will condenser vacuum decrease enough so that I get a turbine trip and block turbine bypass flow?

MR. FINLEY: Yes, so, the question is -- and we do expect normally to have all four circulating water pumps running, but the conditions that would be in place if one were to trip are really going to depend on the temperature of the water at the time.

In fact, we are looking to optimize plant output during the colder months to operate with one of these pumps secured and we're not sure exactly what conditions that will take at this point, but that's

what we're looking at.

So, of course, colder water conditions, if we were to loose one of these pumps might not have any affect at all. Any significant affect, but warmer conditions obviously will affect the condenser back pressure. I'm not aware of what condition that gets you to in terms of trip or not, but --

MEMBER STETKAR: What kind of configuration do you run at Calvert Cliffs 1 and 2 in terms of circ water?

MR. FINLEY: The circ water, Calvert Cliffs 1 and 2, it's an open system.

MEMBER STETKAR: Oh, it's open. Okay.

MR. FINLEY: First of all --

MEMBER STETKAR: Well.

MR. FINLEY: -- there's six circulating water pumps. Normally, all six are running, but again, the impact of loss of one of those circulators really depends on what the Bay water temperature at the time is.

MEMBER STETKAR: Have you had any problems? When I look four if indeed trip of one of them would cause condenser vacuum problems, enough so you get a turbine trip, you know, you probably you're probably looking at a frequency of turbine trips

depending on the running failure rate of those pumps somewhere around the order of once a year to once every four or five years just from loss -- you know, the pump failure rates tend to be about in the one failure in roughly three to ten year sort of range.

MR. FINLEY: Although I will say --

MEMBER STETKAR: I'm just curious. You know, what kind of margin -- have you looked at what sort of margin you have in there? Reckon it's not a safety -- it's not a direct safety issue, but it probably would an issue in terms of turbine, you know, plant trip frequencies.

MR. FINLEY: Yes, obviously, it's a very important reliability issue.

MEMBER STETKAR: Yes.

MR. FINLEY: We're concerned about that as well from our standpoint and I can tell you from the experience at Calvert Cliffs we have had unit trips, of course, due to loss of circulators in service, but from my experience, the cause has mainly been one related to motor maintenance and not to paying attention to motor maintenance and I think throughout the industry that's improved on large motors. I know we've improved existing unit circulating motors. So, we're confident that, you know, from a reliability

perspective, this design, you know --

MEMBER STETKAR: Okay.

MR. FINLEY: -- supports our reliability objectives.

MEMBER STETKAR: Okay. Okay. Okay. One other question while we still have the drawing up here. Is something that I -- it's not shown on here, but I don't think it's addressed directly in the other slides.

The supply to the auxiliary cooling water system comes off the discharge of the circulating water system prior to the inlet to the main condenser. Right?

MR. FINLEY: That's correct.

MEMBER STETKAR: The DCD and the COL FSAR are notably -- information about the auxiliary cooling water system and the turbine closed cooling water system is pretty much absent from both the design certification SAR and at least during the searches that I could from COL FSAR. What loads in the turbine building are cooled by the turbine closed cooling water system?

MR. FINLEY: Okay. So, as you mentioned, you have the auxiliary cooling water system which --

MEMBER STETKAR: And that cools the

turbine closed cooling water heat exchanges. Right? Yes. Yes.

MR. FINLEY: The main load for that is really the closed cooling water system which is a separate closed --

MEMBER STETKAR: Right.

MR. FINLEY: -- loop of very, very clean, very well controlled --

MEMBER STETKAR: Right.

MR. FINLEY: -- water.

MEMBER STETKAR: What loads are cooled by that closed cooling water system?

MR. FINLEY: So, it's basically the turbine auxiliaries. You know, we could list, you know, lube oil and main generator.

MEMBER STETKAR: Is it on -- okay. Is it condensate feedwater system?

MR. FINLEY: Is it condensate feedwater system? I'm not --

MEMBER STETKAR: Coolers for the main feedwater pumps for example, are they cooled from the closed cooling water system?

MR. FINLEY: Let me ask Bechtel to help. Question relates to what loads are on the closed cooling water system.

MEMBER STETKAR: I'll tell you where I'm going with this line of questioning to kind of short-circuit the big discussion. Is what are the functional success criteria since the auxiliary cooling water pumps take suction from the discharge of the circulating water pumps not directly from the cooling tower basin? How many circulating water pumps must be running to provide adequate suction for the auxiliary cooling water system? And what are the effects if I lose the auxiliary cooling water system in terms of operation of equipment in the plant? I don't want to presume without knowing what those cooling loads are what I might lose.

So, I'm interested for example does it cool the main feedwater system? Does it cool the main condensate system?

You mentioned it cools the turbine lube oil system. Does it cool air compressors?

MR. FINLEY: Um. Yes.

MEMBER STETKAR: So, for example, what are those cooling loads. So.

MR. FINLEY: Could maybe start --

MEMBER STETKAR: Only because I can't find -- I'm asking it now because I can't find any information in Chapter 9. I'd normally ask about this

system in Chapter 9, but Chapter 9 of both the DCD, FSAR and what I've seen of the COL FSAR is silent on these systems.

So, I'm trying to understand --

MR. FINLEY: No, I understand.

MEMBER STETKAR: -- their effects.

MR. FINLEY: Maybe we'll start with a list of the loads --

MEMBER STETKAR: Okay.

MR. FINLEY: -- on the closed cooling water system and/or aux cooling water system.

MR. RAO: Hi. My name is Shankar Rao. I'm from Bechtel. I'm the Mechanical Systems Supervisor.

And as your question stated, you know, auxiliary cooling water system is basically a part of the closed cooling water system associated with the main circ condensers.

The pumps provide the motive force during normal operations for the coolers also. So, therefore, if a pump trips, yes, certainly there will be a small adjustment to the flow, but unless three out of four pumps trip, we don't expect it to have an affect on the auxiliary cooling water system.

In addition, we have --

MEMBER STETKAR: Sir, hold on a second. Make sure I understand that statement. Are you saying you need at least two of the main circulating water pumps running?

MR. RAO: Yes.

MEMBER STETKAR: Okay. Thanks.

MR. RAO: Fifty percent capacity.

MEMBER STETKAR: Yes. Thank you.

MR. RAO: In addition, what we have is that all four pumps trip because we do want to protect the secondary system from the asset protection perspective.

We have additional pumps which do take suction from these pipe and which will come on in case of a full trip of all four pumps and run the auxiliary cooling loop in order to provide cooling to some of the operating systems which do need post-trips such as some HVAC which we have in there provide the cooling and also we have compressors for the air compressor system and some hose down cooling for some lube oil and/or hydrogen coolers.

MEMBER STETKAR: Does it also cool the main feedwater pumps?

MR. RAO: The main feedwater pump lube coolers and the seal coolers are cooled by this water.

MEMBER STETKAR: They are?

MR. RAO: Yes.

MEMBER STETKAR: Okay.

MR. RAO: Not directly, but the cooling --

MEMBER STETKAR: Yes. Yes, sure. I'm sure --

MR. RAO: Yes.

MEMBER STETKAR: -- the heat exchangers. I wonder -- I don't want to take up time in this particular chapter. Is it worth asking for a presentation once we get to Chapter 9? We haven't discussed Chapter 9 of either the certified design or the COL on these system.

CHAIRMAN POWERS: I think just make a note of it.

MEMBER STETKAR: Yes, I will. I don't want to take up too much time here, but it's a system -- the reason I'm interested in this is I believe the PRA shows that failures of the turbine cooling water system are a measurable, not necessarily dominant or very important, but measurable, not insignificant, contributor to overall plant risk.

So, we're not talking about something here that's necessarily, you know, the --

CHAIRMAN POWERS: It's --

MEMBER STETKAR: The cooling equipment, you know, the cleaning equipment in the closet. It's --

CHAIRMAN POWERS: It's an issue when it shows up. So.

MEMBER STETKAR: And that's why I'm trying to understand a little bit of it and I've been struggling because it's really not documented anywhere. So, I think probably the best thing to do is to visit it in Chapter 9 and just make sure that I guess AREVA when it comes to the DCD Chapter 9 is prepared to discuss it a little bit. So, we don't take up to much more time today.

CHAIRMAN POWERS: Okay. I mean I think it's useful and I think it's only necessary to flag it --

MEMBER STETKAR: Yes.

CHAIRMAN POWERS: -- when we schedule that meeting and heads up all --

MEMBER STETKAR: Yes.

CHAIRMAN POWERS: -- that we may need to -- it's one of the plant transients.

MEMBER STETKAR: It's one of those things where you can get a plant trip and a loss of feedwater and perhaps loss of condenser depending on what the

cooling loads are and the impact and as I said, I seem to recall the PRA is highlighting the failures of that system are not necessarily a negligible contribution to the overall risk. So, it's something that we can --

CHAIRMAN POWERS: Merits a little bit of looking at.

MEMBER STETKAR: Thank you. Sorry.

MR. FINLEY: Can do that. Okay. So, that was slide 8 and slide 9 speaks to the make-up system for circulating water. So, we have three 50 percent capacity pumps essentially in the intake structure on the Chesapeake Bay. That intake structure shares a four bay with the ultimate heat sink system intake structure. Of course, the four bay is safety related and seismic as well as the safety structure for the ultimate heat sink intake and interaction seismically will be considered between the circulating water system intake structure and the safety structure obviously.

Regarding blowdown from the circulating water system, there is a blowdown. Again, it's a cooling tower type system to prevent concentration of the coolant beyond the point. We do blowdown to a retention basin on site and then there is a 30-inch

pipe that conveys the overflow essentially from the retention basin to the Chesapeake Bay via a seal well and then to the outfall piping in the Bay off shore.

Any questions about the make-up or floating?

MEMBER STETKAR: Yes, I was making some notes here. Do you have -- in the FSAR, it's mentioned that there's a common four bay for the condenser or the circulating water make-up and make-up to the ultimate heat sink.

In the drawings in the FSAR or at least in Chapter 10 of the FSAR, I couldn't tell where the ultimate heat sink make-up takes the suction from that four bay.

MR. FINLEY: Let me draw your attention --

MEMBER STETKAR: Because all the drawings in Chapter 10 sort of focus on the circulating water part. So.

MR. FINLEY: Let me draw your attention to slide 17. If we can shift to -- we did add a back-up slide thinking there might be questions.

MEMBER STETKAR: I saw that. I just wanted to get it on the record.

MR. FINLEY: Right. Appreciate the question then. So, here is a figure from our three-

dimensional model. So, it shows on the right the ultimate heat sink make-up structure and on the left, the circulating water make-up structure and in between, the four bay and, of course, the four bay as I said before is safety related and seismic as well as the ultimate heat sink make-up structure and in addition, there is two 60-inch pipes which actually take suction behind the baffle wall for the existing units 1 and 2. So, we didn't have to dredge a new channel out to the center of the Bay for these units. We're actually taking advantage of that for the new unit.

So, two reductant basically safety-related 60-inch pipes feed that four bay and then on opposite ends of this four bay, you handle the make-up for the different systems.

MEMBER SHACK: Okay. Thank you. That helps a lot. Thank you.

MR. FINLEY: Okay.

MEMBER STETKAR: Yes.

MR. FINLEY: So, back to slide 10. In fact, we have a figure that roughly describes the flow path from the cooling tower blowdown to the retention basin and then to a seal well near the Bay shore and out to the out-fall structure. Beyond that, then

there will be a diffuser-type system there underwater in the Bay to handle any concerns about temperature differentials, et cetera.

Any questions about the blowdown circulating water?

Okay. Move to slide 11. Staying with the circulating water system regarding the piping design, design pressure is also 150 pounds. Similar to the main condenser as I mentioned previously. In terms of materials, we intend to use concrete pipe below the ground and above the ground, we'll have a carbon steel pipe again lined with a material that's compatible with the brackish water from the Bay.

We don't need a vacuum priming system. It turns out we can gravity fit the circulating water system from the basin of the cooling tower without any vacuum problems. So, that'll be nice not needing that system.

And during normal system operation, all of the circulating lines will be at a positive pressure with the circulating water pumps in operation.

Slide 12, regarding chemistry, of course, our chemistry program has not been fully developed at this point. In fact, we don't as yet have our NPDES permit from EPA, State of Maryland. So, that's

something in progress and certainly any chemistry program we have would be compatible with that permit as we go forward.

But, the water will be treated. The water in the basin will be treated. The water from the make-up system will be treated within these guidelines. We intend to add as necessary biocide, algaeside, pH additive.

MEMBER SHACK: Will these be chlorine?

MR. FINLEY: Will these be chlorine?

MEMBER SHACK: Yes.

MR. FINLEY: I don't believe we selected the materials. I know we do use some chlorine at the existing units at Calvert Cliffs.

Let me ask Bechtel. Have we made any determination about use of chlorine?

MEMBER SHACK: Sodium hypochlorite.

MR. FINLEY: Yes, sodium --

MEMBER SHACK: Same thing.

MR. FINLEY: Yes. Yes.

MEMBER SHACK: Yes.

MR. FINLEY: Yes.

MR. RAO: Any biocide may have chlorine-based chemical, but it's not going to be chlorine directly injected into --

MR. FINLEY: So, yes, a chlorine-based biocide is in our plans now.

CHAIRMAN POWERS: Odizon's better.

MR. FINLEY: Noted. Again, I will say we have experience with operating the Calvert Cliffs Unit 1 and 2. So, we'll obviously bring that to bear.

CHAIRMAN POWERS: And that's always a trade-off. Whether it is something new and advanced or use something that you know better and that's trade-off you guys have to make and it's not one that I'm going to make for you for certain.

MR. FINLEY: And as well, we will monitor and analyze these chemistry and any fouling issues, the condenser cold-water inlet and also at the seal well prior to discharge to the Bay and meet any requirements in terms of monitoring it or dictated by the permit obviously.

CHAIRMAN POWERS: You mean anticipating the -- just holding on that permit? I mean this is a pretty straightforward thing. Right?

MR. FINLEY: Yes.

CHAIRMAN POWERS: Yes.

MR. FINLEY: No, we don't anticipate any difficulty. So, moving to slide 13, this topic is flooding analysis. So, we have performed a flooding

analysis for the turbine building. There are no safety-related components in the turbine first.

If there were a pipe break on circulating water in the turbine building, we would expect to release the water to the site grade through siding panels designed to release this water and then we will -- with the grading of the site, we'll direct that water away from safety structures to make sure there's no impact on any safety components.

MEMBER STETKAR: Mark --

MR. FINLEY: Yes.

MEMBER STETKAR: -- you probably anticipated it coming, but where are the auxiliary cooling water pumps and the closed-loop cooling water pumps located in the turbine building? Are they below grade?

MR. FINLEY: Okay. So, I believe yes, but I'll ask Bechtel to confirm. This question is what is the elevation of the closed-cooling water pumps in the turbine building?

MEMBER STETKAR: And are the auxiliary cooling water pumps in the -- they're probably -- well, I don't know. Are they also in the turbine building or are they outside?

MR. RAO: The cooling water pumps, as I

was telling you, they are only needed for when the main pumps are not running. The main circ water pumps provide the normal operating.

MEMBER STETKAR: Ah. Ah. Okay.

MR. RAO: Flow through the system.

MEMBER STETKAR: So, it's just off the discharge. I didn't realize that from your earlier discussions.

MR. RAO: Right. Yes.

MEMBER STETKAR: So, the auxiliary -- okay.

MR. RAO: The auxiliary cooling water pumps which provide in case of main pumps that are tripped are located in the turbine building at the below grade level.

MEMBER STETKAR: Below grade.

MR. RAO: Yes.

MEMBER STETKAR: Okay. And are the closed-cooling water pumps also below grade?

MR. RAO: The turbine side closed-cooling water system are also below grade.

MEMBER STETKAR: Okay. Thank you.

MR. RAO: They are in the same area.

MEMBER STETKAR: Okay. You said the auxiliary cooling water pumps during normal -- make

sure I understand it.

MR. RAO: Um-hum.

MEMBER STETKAR: Well, never mind. They'll get into this in Chapter 9 rather than taking up today.

MR. RAO: Okay. Thank you.

MEMBER STETKAR: Thank you.

MR. FINLEY: Okay. Are there other questions about the flooding analysis? Okay. That brings us then to the conclusion. Basically, slide 14 again we've only discussed the COL items which are site specific. So, much of Chapter 10 is incorporated by reference from the U.S. EPR FSAR.

I'll open it up to any other questions you might have for me on Chapter 10.

CHAIRMAN POWERS: Do we have any additional questions on Chapter 10?

MR. FINLEY: No. We have our conclusions. Okay. So, in conclusion, we have no ASLB contentions on Chapter 10. There were no departures. We had 12 COL items and one interface item.

Our last bullet on the slide is a victim of Murphy's Law. Right after our slide was submitted for this presentation, we received an additional RAI. So, we're working on that. We received it last week.

It deal with flood and certain aspects of the berm structures and we'll be providing response to the staff.

MEMBER STETKAR: This is external flood or --

MR. FINLEY: This is flooding from circulating water and --

MEMBER STETKAR: Water from circulating -- from --

MR. FINLEY: Yes.

CHAIRMAN POWERS: If you've got a gravity feed system, you're going to have --

MEMBER STETKAR: Yes.

CHAIRMAN POWERS: -- a flooding problem.

MEMBER STETKAR: Yes.

CHAIRMAN POWERS: Yes.

MEMBER STETKAR: Right.

CHAIRMAN POWERS: Yes, I mean it's a problem, but it's an issue you can correct. I design challenge.

MEMBER STETKAR: I've looked at several plants where you can try to put the lake or the river or the ocean into the building.

CHAIRMAN POWERS: Now, saying it's -- if there are no additional questions, then I propose that

we go ahead and take a break for 15 minutes until 20 minutes after the hour. I hear no protest from my fellow Committee Members or any participant. So, 20 after.

(Whereupon, at 10:05 a.m., off the record until 10:20 a.m.)

CHAIRMAN POWERS: Let's come back into session. Peter is ready? Who's leading here?

MR. STECKEL: In lieu of Surinder Arora --

CHAIRMAN POWERS: Yes. Yes, he's off with Sandra some place doing who knows what.

MR. STECKEL: We're going to present three chapters to you, Chapters 10, 11 and 16 and there are at least one open item in each of these chapters.

And just to inform you of what's coming up in the near term, we have split our Chapter 2 into two parts and we're scheduled to present the first part which will consist of three subsections January 12th to the ACRS.

Later in the year probably around April or May, we'll be ready to present the second part of that which will consist of hydrology and the geo-technical aspects.

And we're also preparing Chapter 13 which will be due to complete phase 2 around mid-January and

we'll be preparing -- we'll be working with Derek to set up a time to go through ACRS on Chapter 13 for Calvert as well.

And now, we have -- Mr. Peter Hearn is the Chapter PM for Chapter 10 for Calvert and Devender Reddy is the Technical Reviewer who will be presenting today.

Pete.

MR. HEARN: All right. We're going to start with the -- start with the chronology of the major milestones in the review. Begin with the seal well application submittal. It goes through the revisions and ends up with the phase 3 ACRS review.

The review staff who were involved in the Chapter 10 are Devender Reddy to my right here from the Balance of Plant Branch and also Gordon Curran from the Balance of Plant Branch and it was Bob Davis from the Component Integrity and Performance Branch. John Honcharik and Eduardo Sastre also from the Components Integrity Performance Branch.

We have a computer review and passed 13 RAIs and most of them were in the turbine generator area and the auxiliary system and we ended up with one open item which involved the circulating water system.

MEMBER STETKAR: Peter, before you get to

the circulating water system, I had one question on -- I was looking ahead in your slides here.

As I understand it, the turbine missile analysis or the review of that is deferred to Chapter 3. Is that correct?

MR. HEARN: There's a part in Chapter 3.

MEMBER STETKAR: Okay. In the SER, it notes that the COL applicant has submitted the turbine missile probability analysis and there's a reference to an Alstom report. I guess that was submitted in response to RAI questions under Chapter 3. Do you know? Do you actually have that analysis in hand?

MR. HEARN: We have the turbine missile review.

MEMBER STETKAR: Okay.

MR. HEARN: John Honcharik, he is one of the reviewers on Chapter 10 also. So, he can address your question.

MR. HONCHARIK: Yes, my name is John Honcharik.

MEMBER STETKAR: Um-hum.

MR. HONCHARIK: And yes, the applicant has submitted the turbine missile analysis.

MEMBER STETKAR: Could we get a copy of that?

MR. HONCHARIK: Yes, I'm sure. I don't see why not.

MEMBER STETKAR: Okay. Again, you know, it's relevant to Chapter 3 whenever we get it, but I just wanted to make sure that we actually have that document so I didn't have to ask for at the Chapter 3 meeting. Okay. Thanks.

MR. HEARN: I was saying there was open item and it involved the circulating water system and Devender Reddy is here to present the description of the item and the solution.

MR. REDDY: Thanks, Dr. Powers and thanks, Pete. Good morning, Dr. Powers, Dr. Stetkar and other Members of ACRS and Calvert Cliff, my NRC staff and my supervisor and others, good morning.

I'm Devender Reddy and I'm from the Balance of Plant Branch of New Reactor Office and today, I'm going to present the BOP systems of Chapter 10.

Most of the Calvert BOP systems are incorporated by reference from EPR design certification and except the circ water system.

The circ water system is a non-safety related system and our staff's focus was to evaluate what impact it would have adversely on the safety-

related structures, systems and equipment outside of the turbine building. Even though the turbine building may not have the safety-related SSCs, but our concern is basically what happens if there's a failure in the pipe and the floodwater does it impact the SSCs outside? That's what our concern was.

And, Dr. Powers, just I would like to focus and say one thing though, our review, staff review, is basically focused on the safety issues not on the other issues. Basically, that's what our focus is and Pete said we have one open item that is regarding the flood control. There may be potential for flooding of safety-related SSCs due to the CWS pipe rupture and so, that's what our focus was.

In this aspect, they issued RAIs to ensure that it will not impact -- the failure will not impact the SSCs. The applicant, Calvert, they responded. Then the response was not adequate enough. So, we show supplemental RAIs.

Now, the current situation is or is the topic here this morning before the break that we do have an RAI in process. In order to justify this flood control, Calvert is proposing what they call a berm and the berm is it adequate enough? Does it have enough height to divert the water away from the water

coming from the turbine building in case of water system failure?

So, right now, we are kind of talking to them and there is a path forward that could resolve the issue.

So, that's where we are right now. It is an open item. Not resolved yet, but there is a path forward to resolve it.

Beyond that, I don't have anything --

CHAIRMAN POWERS: So, it's pretty straightforward --

MR. REDDY: Yes.

CHAIRMAN POWERS: -- request. They just have to do it. That's all you're saying. Right?

MR. REDDY: Yes, Dr. Powers.

CHAIRMAN POWERS: Yes.

MR. REDDY: Yes.

CHAIRMAN POWERS: Okay. Good. Good. I mean they're good things and bad things about their design and this is just one that has to be taken care of.

MR. REDDY: Basically, that's what those two slides reflect what I said and otherwise, we don't have any open items for the BOP systems. Chapter 12.

MR. STECKEL: I'm ready to move to Chapter

11.

CHAIRMAN POWERS: Chapter 11.

MR. STECKEL: Okay. Thank you.

CHAIRMAN POWERS: Greg, I'm glad you're here. Let me just ask you an administrative question.

MR. GIBSON: Yes, sir.

CHAIRMAN POWERS: We're running about a half an hour ahead of time and just an inkling says we're not getting to lose that and may, in fact, gain some on that. I don't know what your availability of personnel is to continue on with tech specs or should we indeed wait until after --

MR. GIBSON: We are available. Everyone is here.

CHAIRMAN POWERS: And staff?

MR. STECKEL: And we can have the staff here. They'll --

CHAIRMAN POWERS: Okay. We'll play by ear when the times comes, but it may be just convenient to press right ahead.

MR. GIBSON: We can support that. Thank you.

CHAIRMAN POWERS: Thank you.

MR. GIBSON: For our second presentation, we will be talking about Chapter 11, the Radioactive

Waste Systems. Again, this is the same type of introduction that we had before with regard to all of the prefaces that we had with incorporate by reference and how we put together the COLA.

We have Tim Kirkham that I'll be introducing who will be going through the presentation for us and we also are supported by AREVA's Pedro Perez and again, this is the site specific portions and the supplemental information that we have for Calvert Cliffs.

So, with that, Tim, if you could give an introduction to yourself and your background.

MR. KIRKHAM: Sure. Yes, I am Tim Kirkham. I was here before you in April for Chapter 12. Thirty years experience BWRs and PWRs.

CHAIRMAN POWERS: Oh, we don't count that BWR.

MR. KIRKHAM: It was rad waste counts.

CHAIRMAN POWERS: Oh, okay.

MR. KIRKHAM: Sorry. PWR rad waste is easy. And before that, I'm a Purdue man. So.

CHAIRMAN POWERS: Okay. Boilermaker. All right.

MR. KIRKHAM: Sorry. Okay. Please. All right. Slide 4 please. All right. There's two COL

items listed here. These are from 11.24 and 11.34 regarding the cost-benefit analysis for liquid and gaseous radioactive waste respectively listed here.

Using Reg Guide 1.110 methodology, cost-benefit ratios for augmented system components were calculated to be less than one, but those comparison's are shows here for Calvert Cliffs 3 dose versus the EPR dose.

As you can see with the current design and site specific factors, the Calvert 3 doses are lower than and bounded by the EPR design.

Any questions about any of these doses or anything on this slide?

Slide 5, this COL is from Section 11.43 radioactive effluent releases, a standard process control program is described in NEI 07-10A. According to the milestone schedule in Chapter 13, the PCP Program will be written and approved according to NRC regulations and guidance.

The second COL item shown is from Section 11.52 which is the system description, the process monitoring and sampling systems. The ODCM as described in NEI 07-09A will be developed and implemented according to the milestone schedule in Chapter 13 and also will be developed according to

regulations and guidance.

Any questions there?

Slide 6, this is a departure in the current revision of the FSAR, but becomes a COL item in revision 2 of the EPR FSAR. The activity in the liquid effluent is diluted by two potential means prior to reaching a given dose receptor. The first is the mixing that occurs in the discharge canal and seal well prior to the effluent reaching the plant outfall. This dilution is provided by cooling tower blowdown, dilution pumps, desalinization, plant membrane filtration, RO release, chemical cleaning waste, everything else.

The second dilution source is the mixing with and subsequent dilution by the receiving water prior to reaching the dose receptor.

Any questions?

MEMBER RYAN: How do you handle the uncertainty in those estimates?

MR. KIRKHAM: That's a good question.

MEMBER RYAN: Time of year. You know, summer versus winter, one source versus the other. I mean I guess I would have guessed between the two sources of mixing you can have a range of potential release concentrations.

MR. KIRKHAM: Well, and one advantage, too, in the calculations that were done here, we used very conservative mixing.

MEMBER RYAN: Help me understand that.

MR. KIRKHAM: Conservative as in the calculations were done with 9,000 gallons per minute. Correct?

MEMBER RYAN: Correct.

MR. KIRKHAM: The actual Calvert Cliffs 3 mixing is a little over 21,000 gallons per minute.

MEMBER RYAN: Okay. Is there a report that puts all this together in one place that I could look at?

MR. KIRKHAM: It's in the -- all that's discussed in the FSAR in Chapter 11. Is that your question?

MEMBER RYAN: No, in terms of this departure, have you addressed that separately or is that in the chapter?

MR. KIRKHAM: The departure is in the chapter as currently written.

MEMBER RYAN: Okay. Okay. All right. That's fine. Thanks.

MR. KIRKHAM: Yes.

MEMBER RYAN: But, in terms of an

uncertainty analysis, you're really just relying on the bounding case that you're so far under the actual --

MR. KIRKHAM: Yes.

MEMBER RYAN: -- flow? Okay. Thanks.

MR. KIRKHAM: Yes. Okay. Slide 7, this is a drawing that you saw earlier and I decided to steal it from Mark to help with our case. This drawing shows how --

CHAIRMAN POWERS: Something out of those guys. Huh?

MR. KIRKHAM: Engineering is worth something. Right? Yes. This drawing shows how effluents leave the site.

It's kind of hard to read there, but up there in the upper left is where the circulation water blowdown is and the desalinization plant reject and then in the center right here is where the plant liquid rad waste comes from and then that connects downstream of the retention basin. It comes in here to the T at 11 gallons per minute.

But, then, you know, upstream is where all the dilution mixing comes and that's --

MEMBER RYAN: How many gallons a minute? I'm sorry, Tim.

MR. KIRKHAM: It's 11 coming in in the liquid rad waste system.

MEMBER RYAN: Eleven gallons.

MR. KIRKHAM: That's correct and then 21 and change coming from the ultimate heat sink and all the stuff down here on the lower left. Okay.

All right. This is departure also in the current revision in the FSAR, but again becomes a COL item in rev 2 of the EPR FSAR.

This departure simply states that two pathways, one liquid and one gaseous, were not considered in the calculation of off-site exposure due to the site specific characteristics that we have and here they're talking about the brackish waters. So, we're not going to -- the irrigation is negligible. Same thing with milk animals.

Any questions there?

Okay. Slide 9, there's four supplemental items shown here. They all have to do with dose from effluents and the last one has to do with release due to tank failure.

The first one indicates the EPR dilution flow rate versus the Calvert 3 flow rate. There we go. That's what I talked about earlier.

Obviously, the increase in actual flow

rate will reduce the dose from liquid effluents.

The second and third supplemental items deal with using a bounding atmospheric dispersion factor instead of the site-specific value.

And then the last supplemental item down there deals with the postulated liquid tank failure. As listed here, the EPR evaluation bounds at the Calvert 3 contamination event.

MEMBER RYAN: Okay. Tell me about the second one. What is the -- oh, I'm sorry. I see it there. It's 1.0 times 7 to the minus 3. I gotcha. Sorry.

MR. KIRKHAM: Right. And that's very conservative --

MEMBER RYAN: Yes. Yes.

MR. KIRKHAM: -- factor.

MEMBER RYAN: And so, is a magnitude bounding of Calvert Cliffs. Gotcha. Thank you.

MR. KIRKHAM: Um-hum. Turn it back over to Greg for conclusions.

MR. GIBSON: Okay. Again, for our Chapter 11, we had no ASLB contentions. We have the four COL information items that we have included in our discussions for Chapter 11. We had two departures from the EPR and we have one RAI response which is

pending and it's due in about two weeks.

CHAIRMAN POWERS: Thank you. Thank you. Okay. Good.

MR. STECKEL: This is Mr. Jay Patel. He's the Chapter PM for Chapter 11 and Jean-Claude will be presenting as our technical --

CHAIRMAN POWERS: And we know them both.

MR. PATEL: Thank you, Jim. Thanks.

My name is Jay Patel. A little background of myself, I've been with the agency for a year and a half in the EPR Projects Branch. I'm the Chapter PM for Chapter 11, Chapter 12 and Chapter 2 for the DC.

Before the agency, I was out in Chicago working at Sargent & Lundy doing modification packages and conceptual designs and before that, I was working at Exelon Corporation in the east at TMI, Oyster Creek, Limerick and Point Beach performing refill. So, that's my background.

Staff team for Chapter 11 consists of Michelle Hart which is for Section 11.1 which is the IBR Section, Jean-Claude Dehmel Sections 11.2 to 11.5 and Joshua Wilson who provided input to Sections 11.2 and 11.4.

As you can see, these are -- there were nine total RAI questions which were asked and three

open item questions which were in Section 11.2 and 11.3.

MR. DEHMEL: I'm Jean-Claude Dehmel with the Health Physics Group. I'm a certified health physicist. I've been with the NRC ten years and have had some experience before with the construction of power plant, namely, Waterford 3 and St. Lucie Unit 2 and I've been involved extensively in a prior professional life on effluent tech specs.

Let me go over these items that were reviewed that were a topic of interest for the staff.

This slide in essence is kind of a sneak preview of all of the other ones that have come through. It's kind of wrap up of all of the issues. I'm going to skip to the next one.

Chapter 11.1 as we just noted everything is IBR. So, in essence, there was really nothing for us to review. We can only confirm that there were no departures and not supplemental information.

Next slide please. With respect to liquid waste management system, our topics of review addressed the interfaces with the other FSAR sections, COL information items as well as supplemental information and departures.

This information basically is a summary of

what was contained in the initial application. It does not reflect the various iterations of the FSAR that have been submitted since then. So, some of these things have changed by now.

Next slide please. So, the result of our review of Chapter 11.2. So, we looked at the cost-benefit analysis that was conducted or presented in the initial FSAR and we concluded that it was based on the U.S. EPR design certification and the staff thought that this was really not applicable to Calvert Cliffs Unit 3 sites and we requested that the applicant conduct a site specific cost-benefit analysis which they have done.

We also asked the applicant to assess doses on liquid effluent releases for the purpose of demonstrating compliance with part 20, the effluent concentration limits, the doses and the effluent concentration limits of Appendix B and Part 50 Appendix I. The initial application had simply endorsed by reference the information from the DCD.

We also asked the applicant to confirm of endorsement of Regulatory Guide 1.143 on quality assurance requirements for those portion of the system, that would be the responsibility of the COLA. Making a distinction between the QA requirements and

QA applications that are part of the design certification which are not in question here, but to identify those part of the QA requirements that would be the responsibility of COLA for construction, installation and so on in testing.

By the way, we -- was used in this particular cases we have identified is primarily Chapter 11.2 and asked the applicant to address the similar ramification for Section 11.3 on gaseous waste management system and Section 11.4 on the solid waste management system. So, this RAI addresses similar related issues for Chapters 11.3/11.4 while the RAIs are not repeated again for Chapters 11.3/11.4.

So, basically, at this point, we are essentially -- we're looking at the proposed revision of the FSAR and confirming that RAI issues have been properly addressed.

And finally, we found the modification to the tech specs acceptable with respect to the modification of the tech specs since design does not have outside rad waste storage tanks. For example, refueling water storage tanks, there's no such thing. So, the tech spec was appropriately modified to remove that portion of the tech spec.

Next slide please. On 11.3, the gaseous

waste management system again kind of similar type of issues associated with ODCM operational requirements, the QA, the tech specs on the radioactivity monitoring program. The COL information items, the supplemental information and departures.

Next slide please. So, the results, basically, like with the liquid waste management system, the cost-benefit analysis that was provided in the initial FSAR the staff saw the data was not applicable because it was based on the U.S. EPR cost-benefit analysis and we requested the applicant to submit its own site-specific cost-benefit analysis.

A similar request for demonstrate compliance with outside doses, the MEI and population doses and effluent concentration limits of Part 20 Appendix B. Again, the related QA aspect with the gaseous waste management system that are the responsibility of the COLA and then we noted there was a departure associated with one particular sector that there were -- no one was expected to reside in that particular portion, the sector being located on the Chesapeake Bay.

And at this point, we're waiting -- we did get the responses from the applicant and we're in the process of reviewing the responses to ensure that RAI

issues have been properly addressed and corrected.

Next slide please. For the solid waste management system, again, there this is the first part of Chapter 11.5 -- 11.4 I should say that addresses -- identifies an operational program, the process control program and in this particular case, the applicant has endorsed the NEI template associated with that. We'll see that later on. It is noted below.

We also confirmed with respect to the supplemental information a departure that basically there's no need for cost-benefit analysis for the solid waste management system because although the associated effluent releases, liquid and gaseous, associated with the operation of the solid waste management are captured in Chapter 11.2/11.3.

Again, same quality assurance issues associated with the installation and the testing and procurement of the solid waste management system and there was a modification to another tech spec associated with the effluent release reports. The generic tech specs identifies reporting requirements for multiple sites which -- I'm sorry. For multiple plants. Since it's only one plant, so, they modified the tech spec to actually reflect that the reporting requirement would be for Unit 3 only which was fine.

The COL information, again, they've adopted NEI 07-10A, the generic process control program for the purpose of managing low-level radioactive waste on site and we found that acceptable and there were no departures associated with this FSAR section.

Next slide please. So, the results is that with respect to radioactive waste storage, we noted that the design provision in the DCD is for about eight years for the storage for Class B and C waste. We've asked the applicant in this case to provide or identify additional arrangement for the storage of Class B and C waste beyond the eight years capacity of the rad waste building.

So, the applicant is committed to implement waste minimization programs, is committed to establish commercial agreements with third-party commercial vendors and to store the waste and/or dispose of the waste on their behalf and also has made a commitment to construct an on-site low-level waste storage capacity should the eight years worth of storage capacity be not suitable.

MEMBER RYAN: How far do you take that in the review process at this step? Are you going to look at the design of an on-site storage facility now

or just be satisfied there's a commitment they do that?

MR. DEHMEL: Yes, right now the approach we're using is that the commitment is adequate. That they will look at these options, look at what's available commercially with respect to interim storage or storage and disposal on their behalf by two commercial vendors and then should those provisions no longer become available or specific instructions are imposed that the applicant cannot meet, to the point, the applicant will build an on-site storage facility.

So, the thought was to the time there would be a licensee holder, there would be an operating facility and they would perform that in the accordance existing requirements in part of the 50.59 process and at that point, do the required analysis as part of 50.59 process. Determine whether or not any of the provisions of the 50.59 process are triggered and therefore, a license amendment would be required or it can't be done under existing provision of the license and the Part 50 license.

MEMBER RYAN: And I appreciate it. That makes a lot of sense to me because I mean when you look at the eight years plus where we are now relative to when they'd be generating waste --

MR. DEHMEL: Right. Right.

MEMBER RYAN: -- it's decades.

MR. DEHMEL: Right. Yes.

MEMBER RYAN: So, it's a tough question to --

MR. DEHMEL: Right. It's difficult, you know. It's a difficult set of predictions because we just don't know with respect to the accessibility of Class B and C waste disposal.

MEMBER RYAN: But, the backstop is the ability to -- the requirement or the agreement to have an on-site storage facility if nothing else worked out.

MR. DEHMEL: Yes, that's -- absolutely, yes.

MEMBER RYAN: Yes.

MR. DEHMEL: That is the -- that is the backstop.

MEMBER RYAN: Thanks.

MR. DEHMEL: So, the staff, we found that the proposed option, the commitment to meet NRC regulations and guidance on low-level waste storage and disposal acceptable and we found the modification of the tech specs on deleting the reporting requirement for sites with multiple units acceptable.

That was fine.

And obviously, the staff has found the adoption of NEI 07-10A templates acceptable as a generic approach with the understanding that the commitment to actually put together a site specific process control program is a commitment identified in Chapter 13.4 as an operational program before fuel load.

The process in effluent radiological monitoring and sampling system, Chapter 11.5 of the application, the interface requirements with 11.2, 11.3, 13.4 and Chapter 16. Again, the same pattern.

The commitment to compliance with effluent release limits and doses and effluent concentration limits in the ODCM. The COL information item with respect to adopting the NEI template 07-09A with respect to those commitments and there were no departures associated with Chapter 11.5.

Next slide. Thanks. So, there was unique aspect here associated with the -- also a dose calculation manual because we had two different entities operating three plans from a single site exposing a single MEI outside. So, we asked the applicant to identify administrative measures and arrangements on how the ODCM would be used to control

-- jointly control and manage all effluent releases such that the doses from all three operating plants would still meet Part 20, 1301 and 1302 in the effluent concentration units of Appendix B to Part 20.

So, the applicant proposed arrangement to coordinate and control all effluent releases with the operator of the other plant, namely Constellation, in this particular case. But, they haven't essentially formalized those procedural arrangements yet with Constellation. So, that has yet to be done.

So, this would be subject to a point of scrutiny when we review the plant-specific outside dose calculation manual. That will be available for NRC inspection six months before fuel load.

MEMBER RYAN: And I guess the question at this stage I think is is there enough head room in the off-site dose calculations for both of them to share the MEI dose without stresses either of the two owners' contribution?

MR. DEHMEL: Yes, there is enough. Yes, there is enough leeway.

Remember that all the analysis are typically done for licensing purposes, reflect some of the overly considered assumptions.

MEMBER RYAN: Absolutely.

MR. DEHMEL: Yes.

MEMBER RYAN: But, I just want to get on the record that this is a sharing that's not expected at this stage to challenge the limit.

MR. DEHMEL: Correct.

MEMBER RYAN: Okay.

MR. DEHMEL: Yes, and this issue first surfaced in the late '70s/early '80s with respect to demonstrate compliance with 40 CFR or 90 where the dose limit is 25 millirem to a real person and at that point, you know, I go 5, 4, 3 . The agency identified you could have up to four nuclear power plants without any concern with exceeding the EPA environmental standards of 25 millirem per year.

MEMBER RYAN: Thank you.

MR. DEHMEL: Okay. And so, we found the proposed commitment and integration of these arrangements with Constellation acceptable. Again, to be formalized and reviewed by the staff by the time the site specific outside dose calculation manual is developed before fuel load.

So, the combination of adopting the NEI 07-09A ODCM template plus those commitments to modify those portions of the ODCM obviously acceptable and again, there was a tech spec that had to be modified

with respect to deleting the reporting requirement for sites with multiple operating units. So, in this case, it's one operating unit for unit start not all three of them.

Next slide please. So, this is kind of a wrap up. So, there are still three open confirmatory items that we need to look at.

Just for your information, the applicant resubmitted just last week and a half or so ago a complete rewrite of Chapter 11. So, we're in the process of going through it. So, there have been major changes.

So, we found the adoption of the application of NEI PCP template 07-10A acceptable for the purpose of complying with NRC regulation and state and other local regulation for the purpose of storing and disposing of low-level radioactive waste.

The proposed arrangement to secure commercial agreements to still process and dispose on the applicant's behalf low-level waste, we found that acceptable at this point.

Next slide please. And again, we found the adoption and modification of the ODCM template -- the proposed modification of the ODCM template acceptable in complying with NRC regulations for the

purpose of controlling liquid effluent -- liquid and gaseous effluent releases from both the UniStar plant as well as Constellation and the other ones, Constellation plant.

And again, the kind of -- which was stated earlier, the implementation of ODCM and the process control program with respect to Chapter 13.4 -- condition was also found to be acceptable.

That's all I have.

MEMBER RYAN: On the items that are currently under review, you expect to come back and brief the Committee on those? Resolve those three I think there were.

MR. DEHMEL: Well, the issues that are under review are the recalculation of the MEI population doses in Chapter 11.2 and 11.3 and then the one RAI that's still open is a QA issue associated with the procurement, installation and testing of the liquid and gaseous solid waste management system. For those portion of the design and limitation of the systems that are the responsibility of the COLA. So, you know, that's kind of a --

MEMBER RYAN: Phase 5.

MR. DEHMEL: -- project management issue whether --

MEMBER RYAN: Right.

MR. DEHMEL: -- or not we'll come back here.

MR. STECKEL: We'd come before ACRS again.

MR. DEHMEL: Yes. Okay.

MEMBER RYAN: Okay. Thank you.

CHAIRMAN POWERS: Any additional questions on this subject? You done good.

MR. GIBSON: Okay. Thank you very much. This is the third of our presentations on Chapter 16 for technical specifications.

We have here today Roger Scott who will introduce himself in a moment and also Robert Sharpe and Robert Sharpe is with AREVA and AREVA has completed their presentations on Chapter 16 as well.

CHAIRMAN POWERS: Right.

MR. GIBSON: So, with that, we'll focus on the plant specific technical specifications for Calvert Cliffs and with that, let me introduce Roger. If you would please give a little bio for the group please.

MR. SCOTT: I'd be happy to.

My name is Roger Scott. I'm a Engineer with UniStar and have about 15-years experience in the licensing area and about 12 of that with tech specs.

I've been involved in six different conversions of tech specs with improved tech specs and I was also the Licensing Supervisor at Point Beach for five years.

I guess we'll go to slide four. In Chapter 16, there's one COL information item which requires a COL applicant to provide information to address the reviewer's notes, any bracketed items which may appear in the tech specs of the bases and to address this, we implement or incorporate by reference the generic tech specs in the DC.

In Part 4 of the COLA, we address any differences between the generic tech specs and the plant-specific tech specs and before the final SER with no open items is issued by the NRC for the DC, we'll have a complete set of plant-specific tech specs in COLA Part 4.

Next slide please. So, some of the supplemental information as provided is to address the reviewer's notes and the bracket items that are called out in the generic tech specs and one of those items is to provided some information on the ultimate heat sink make up water system, describe what we define as a operable emergency make up water source.

Additionally, as a carryover from Chapter 7, we provide a plant-specific post-accident

monitoring instrumentation which is the essential service water cooling tower basin level.

Next slide. Departures and exemptions from the generic tech specs include deletion of some design information that's related to the toxic gas detection isolation systems. In FSAR Chapter 2, there's an evaluation that was performed and the site-specific information that it concluded. There were no credible events that require toxic gas detection and isolation. So, that information has been removed from the plant-specific tech specs.

Additionally, we've included a setpoint control program in the administrative program section of the tech specs and we do that in lieu of providing the limiting trip setpoints and design limits and that issue is still an open item. It's being addressed in RAI 260 and was submitted on November 19th.

Interim Staff Guidance-08 provides some information that we found useful for how we can address the conundrum of needing complete tech specs at COL issuance and not being able to provide some design information related to the setpoints and one of those options is to revise a setpoint control program which we have done.

Next slide please. So, in the setpoint

control program, the protection system reactor trip and the engineer safety feature setpoints have been relocated to the setpoint control program as well as the tech specs surveillances related to those instruments are referenced into the setpoint control program.

The setpoint control program is going to be based on the NRC reviewed and approved methodologies.

Next slide.

MR. GIBSON: So, with this, it concludes our Chapter 16. Again, no ASOB contentions. We only have the one COL information item and there are no RAI responses pending.

CHAIRMAN POWERS: Any questions on this material?

MR. GIBSON: Thank you.

CHAIRMAN POWERS: Thank you, Greg.

MR. STECKEL: Okay. We're ready to go. This is --

CHAIRMAN POWERS: Let's do it then.

MR. STECKEL: -- Mr. Hearn again, Chapter PM for 16 and he'll be introducing Mr. DeMarshall, Technical Reviewer.

Pete.

MR. HEARN: Peter Hearn and I'm the Chapter 16 PM and the review staff that -- technical review staff involved in the review are Hien Le, Joe DeMarshall and Derek Scully from the Technical Specifications Branch.

They went through the review and all the questions involve either the instrumentation or the electrical system. Most of them were instrumentation and there's one open item in the instrumentation system.

That open item will be discussed by Joe DeMarshall, the Tech Spec Reviewer.

MR. DEMARSHALL: Good morning. My name is Joe DeMarshall and I am the Tech Reviewer for the instrumentation electrical system tech specs for the Calvert RCOLA and also for the EPR DCD.

Background, I joined the NRC in March of '08, Tech Spec Branch, Office of New Reactors. Prior to joining the NRC, spent 18 years at PSEG Nuclear in South Jersey. All 18 years at Hope Creek. Six years as Systems Engineer and the last eight, I spent as a Licensed Non-Shift Senior Operator.

Prior to my time at PSEG, six years Naval Nuclear Power Program. Qualified as direct operator and as supervisor in submarines.

Okay. Description of open items, as Pete mentioned, we have only one. It's RAI 260, question 16-22 and that was issues as a follow-up RAI for the applicant to provide the additional information necessary for the staff to conclude that the PTS administrative controls setpoint control program specification contains sufficient and appropriate detail to ensure regulatory compliance with the requirements of 10 CFR 50.36(c)(1)(ii)(A) and basically states that tech specs shall include building safety systems steps.

Okay. Plant-specific setpoint information cannot be obtained prior to COL issuance because instrumentation uncertainties using setpoint calculations wouldn't already be determined until after completion of the detail design. Uncertainty determinations rely upon supporting information such as equipment selection, as-built configuration and system test results.

And COL applicants must complete site-specific tech spec information in the plant-specific tech specs in accordance with DC/COL-ISG-8 necessary content of plant-specific technical specifications when a combined license is issued and this has to be done prior to COL issuance using one of three options.

Option 1 provides site-specific tech spec information which basically would be plant-specific ultra plus values which is not practical prior to COL issuance for reasons stated.

Option 2 provides usable bounding information. These will be values that bound the plant-specific setpoint values, but by which the plant could be safely operated.

Option 3 relocates site-specific information to a licensee-controlled document and establishes an administrative control technical specification that requires determining the information using an NRC-approved methodology and that controls changes to that information.

UniStar has proposed an administrative control technical specification for a setpoint control program to satisfy 10 CFR 50.36(c)(1)(ii)(A) and that'll specify explicit values for the ultra plus settings in the PTS and this is option 3 as previously stated.

Again, the setpoint control program is a departure from the EPR GTS that will require staff approval via an exemption from the future design certification rule.

I'd just like to provide a little lead-in

before these two items. U.S. EPR protection system is an integrated digital reactive protection system and engineered safety features actuation system. RPS fast functional logic and algorithms are performed by protection system software. The supplements of which are stored as additional values that have no potential for variation.

For the digital protection system, the only factors that can result in variations in mature functions are uncertainties that are associated with the analog portion of the system. Things like the analog sensors, aided de-conversion circuitry and analog filtering circuitry.

Okay. So, the first bullet. The setpoint control program tech spec is currently written to support protection functions implemented via conventional analog bistables. Analog bistables are not utilized in the digital U.S. EPR protection system.

Revisions to the setpoint control program tech spec are necessary to ensure that the specification is implementable and that it accurately reflects the surveillance testing strategy proposed for the digital U.S. PER protection system, i.e., performance of calibrations limited solely to those

analog components subject to drift and this issue is being tracked under the single open item RAI 260, Question 16-22.

Next slide. Okay. So, in conclusion, the staff's review confirmed that the COL applicant addressed the required information relating to technical specifications with the exception of the one identified open items and the COL applicant is expected to address the outstanding information in the COL plant-specific tech specs.

And that concludes my presentation.

CHAIRMAN POWERS: Any questions you'd like to pose on this?

We come back here. Any other questions we would like to propose on any of the subjects?

We've come up with one action item and that is that Sandra Sloan will make a presentation at our next Subcommittee meeting on Chapter 9.

And in the interim, Derek and I are going to work up some strategy on how to bring some of this material up to the Committee so we can get it off the books and move forward out of -- move it out of, what is it, phase 3 into phase 4 and I don't know what that strategy is going to be.

There's some congestion on the calendar,

but we will come up with a strategy and negotiate with all the parties involved to facilitate that. A lot of this stuff is fairly routine and I don't know that we need a huge presence in front of the Full Committee to go through it.

And I mean quite frankly the problem we're having here, of course, there are not a lot of issues. Which is good and we just need to get things off the books and we'll come up with some strategy and chat with you. I just don't know when it's going to be because of congestion on the calendar.

Any comments from the Committee Members?

MEMBER RYAN: Thanks very much. This is a very productive day.

CHAIRMAN POWERS: Oh, yes, it's very useful for us --

MEMBER RYAN: Well done presentations.

CHAIRMAN POWERS: -- to go through this stuff. I don't doubt. I kind of doubt it's worthwhile going into the steps in detail that we did in front of the Full Committee on this material and so, we need to figure out exactly how to do that and Derek and I will chat with you on that as we set up some time to do that.

With that, I think I'm going to adjourn

the Subcommittee meeting and thank all the participants and, in fact, compliment you for a lot of work. I know it takes a lot to get to this point to say there are no open items or very few open items.

So, with that, we're adjourned.

(Whereupon, at 11:16 a.m., the meeting was adjourned.)

AREVA

Presentation to ACRS U.S. EPR Subcommittee

Design Certification Application
FSAR Tier 2 Chapter 13

Pedro Salas
Technical Consultant

EPR™ by AREVA

AREVA

Chapter 13, Conduct of Operation: Chapter Topics

- Organizational Structure of Applicant – 13.1
- Training – 13.2
- Emergency Planning – 13.3
- Operational Program Implementation – 13.4
- Plant Procedures – 13.5
- Fitness for Duty – 13.7

Chapter 13, Conduct of Operation: Organizational Structure of Applicant – 13.1

- A COL applicant that references the U.S. EPR design certification will provide site specific information for management, technical support and operating organizations
  - The operating organization describes the structure, functions and responsibilities established to operate and maintain the plant
  - Additional information for a COL applicant to develop an operating organization is provided in Chapter 18

Chapter 13, Conduct of Operation: Training – 13.2

- A COL applicant that references the U.S. EPR design certification will provide site specific information for training programs for plant personnel
  - Additional information on training is provided in Section 18.9

Chapter 13, Conduct of Operation: Emergency Planning – 13.3

- A COL applicant that references the U.S. EPR design certification will provide a site specific emergency plan in accordance with 10 CFR 50.47 and 10 CFR 50 Appendix E
  - Emergency planning is within the scope of a COL applicant
  - Design features, facilities, functions and equipment that are technically relevant to the design and are not site-specific, and which affect some aspect of emergency planning or the capability of a licensee to cope with plant emergencies are described in the Design Certification
- Space suitable for a technical support center (TSC), which demonstrates compliance with the design requirements for staffing levels is provided within the integrated operations area adjacent to the main control room (MCR). This space is within the Safeguard Building

Chapter 13, Conduct of Operation: Operational Program Implementation – 13.4

- A COL applicant that references the U.S. EPR design certification will provide site specific information for operational programs and schedule for implementation

Chapter 13, Conduct of Operation: Operational Program Implementation – 13.4

- The following operational programs are described in the FSAR, and the COL applicant will verify or provide the implementation schedule:
  - Inservice inspection program (Section 5.2.4 and Section 6.6)
  - Inservice testing program (Section 3.9.6 and Section 5.2.4)
  - Environmental qualification program (Section 3.11)
  - Preservice inspection program (Section 5.2.4 and Section 6.6)
  - Reactor vessel material surveillance program (Section 5.3.1)
  - Preservice testing program (Section 3.9.6 and Section 5.2.4)
  - Containment leakage rate testing program (Section 6.2.6)
  - Fire protection program (Section 9.5.1)
  - Motor-operated valve testing (Section 3.9.6)
  - Initial Test Program (Section 14.2)

Chapter 13, Conduct of Operation: Operational Program Implementation – 13.4

- The following operational programs are described by the COL applicant, and the COL applicant will provide the implementation schedule:
  - Non-licensed plant staff training program (Section 13.2)
  - Reactor operator training program (Section 13.2)
  - Reactor operator requalification program (Section 13.2)
  - Emergency planning (Section 13.3)
  - Security program (Section 13.6)
  - Quality assurance program–operation (Section 17.5)
  - Radiation protection program (Section 12.5)
  - Maintenance rule (Section 17.6)
  - Cyber security plan (Section 13.6)
  - Process and effluent monitoring and sampling program (Section 11.5)
  - Process Control Program (PCP) (11.4)

Chapter 13, Conduct of Operation: Plant Procedures – 13.5

- A COL applicant that references the U.S. EPR design certification will provide site specific information for administrative, operating, emergency, maintenance and other operating procedures
  - **Administrative Procedures** - Specific information for procedures is provided by the COL applicant
  - **Operating and Maintenance Procedures** - Specific information for procedures is provided by the COL applicant
  - **Operating and Emergency Operating Procedure** - Specific information for procedures is provided by the COL applicant
    - 13.5.2.1 Specifies requirements for Emergency Operating Procedure (EOP) development
    - AREVA will develop an EPR™ EOP Technical Bases Document which provides vendor recommended guidelines and form basis of EOPs to be developed by the COLA applicant/COL holder
  - **Maintenance and Other Operating Procedures** - Specific information for procedures is provided by the COL applicant

Chapter 13, Conduct of Operation: Fitness for Duty – 13.7

- A COL applicant that references the U.S. EPR design certification will submit a Physical Security Plan (PSP) to the NRC to fulfill the fitness for duty requirements of 10 CFR 26

Chapter 13, Conduct of Operation: Acronyms

- **COL** - Combined Operating License
- **CRE** - Control Room Envelope
- **EOP -** Emergency Operating Procedure
- **ERDS** - Emergency Response Data System
- **MCR** - Main Control Room
- **OSC** - Operational Support Center
- **PCP** - Process Control Program
- **PICS** - Process Information and Control System
- **TSC** - Technical Support Center

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

AREVA EPR Design Certification Application Review

Safety Evaluation Report with Open items

Chapter 13: Conduct of Operations

November 30, 2010

Staff Review Team

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

- **Technical Staff**
  - Richard Pelton, Training and Assessment Specialist
    Operator Licensing and Human Performance Branch
  - James Kellum, Senior Reactor Operations Engineer
    Operator Licensing and Human Performance Branch
  - Mark Lintz, Reactor Operations Engineer
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  - Sara Bernal, Health Physicist
    Health Physics Branch
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    Emergency Preparedness, New Reactor Licensing Branch

Staff Review Team

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

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- **Project Managers**
  - Getachew Tesfaye, Senior Project Manager
  - Michael Miernicki, Senior Project Manager

Overview of Design Certification Application, Chapter 13

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

SRP Section/Application Section		No. of Questions	Status Number of OI
13.1	Organizational Structure of Applicant	0	0
13.2	Training	0	0
13.3	Emergency Planning	7	0
13.4	Operational Program Implementation	0	0
13.5	Plant Procedures	0	0
13.6	Security	144	3
13.7	Fitness for Duty	0	0
Totals		151	3

Technical Topics of Interest

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

Sections 13.1 - Organizational Structure of Applicant
13.2 - Training
13.5 - Plant Procedures

- All three sections have no open items.
- All three sections contain COL information items for these sections to be addressed by COL applicant.
- The staff agrees that the COL information items are the COL applicant's responsibility and are appropriate to meet the criteria of NUREG-0800, Standard Review Plan

Technical Topics of Interest

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

Section 13.3. Emergency Planning

- No open items
- COL Item 13.3-1: COL applicant to provide emergency plan
- Proposed space for TSC is acceptable
- SRP Interface Areas
  - TSC habitability is addressed in SER Section 6.4 with additional dose analysis in Section 15.0.3.
  - TSC HVAC is addressed in SER Section 9.4.1.
  - TSC voice and data for support of emergency response operations is addressed in Section 7.1, 7.5, and 9.5.2

Technical Topics of Interest

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

Section 13.4. Operational Program Implementation, and Section 13.7 Fitness for Duty

- No open Items
- Operational Programs listed in FSAR consistent w/ SECY-05 -0197 guidance
- Consistent with 10CFR73.54 to list cyber security plan as an operational program
- Operational programs to be addressed by COL applicant
- The staff agrees that the FFD program is the COL applicant's responsibility, and that the FFD program COL information item is appropriate and in accordance with 10 CFR Part 26, "Fitness for Duty Programs"

Conclusion

- Except for the open items listed above, the staff concludes that Chapter 13 of the EPR FSAR is acceptable in accordance with applicable regulations

Questions?

Acronyms

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

- FFD - Fitness for Duty
- HVAC – Heating Ventilation and Air Conditioning
- TSC - Technical Support Center

UNISTAR NUCLEAR ENERGY

Presentation to ACRS
U.S. EPR™ Subcommittee
Calvert Cliffs Nuclear Power Plant Unit 3
FSAR Chapter 10
Steam and Power Conversion System
November 30, 2010

Chapter 10, Steam and Power Conversion System
Introduction

- RCOLA authored using ‘Incorporate by Reference’ (IBR) methodology.
- To simplify document presentation and review, only supplemental information, or site-specific information, departures or exemptions from the U.S. EPR FSAR are contained in the COLA.

Chapter 10, Steam and Power Conversion System
Introduction

- AREVA - ACRS Meeting for U.S. EPR FSAR Chapter 10, Steam and Power Conversion System, occurred on November 19, 2009.
- Today's presentation was prepared by UniStar and is supported by Bechtel, AREVA and Alstom.
- Today Mark Finley, UniStar Engineering Manager, will present the Calvert Cliffs Unit 3 FSAR Chapter 10.
- The focus of today's presentation will be on site-specific information that supplements the U.S. EPR FSAR.

Chapter 10, Steam and Power Conversion System
Agenda

COL Information/Interface/Site-Specific Supplemental Information Items

Turbine-Generator

- Rotor Integrity Program

Steam and Feedwater System Materials

- Flow Accelerated Corrosion Program

Circulating Water System

- Condenser pressure and Materials
- CWS general description
- Piping
- Vacuum priming system
- Chemistry of CWS
- Flooding Analysis

Conclusions

Chapter 10, Steam and Power Conversion System
COL Information Items

Turbine-Generator

- Rotor Integrity Program
  - Calvert Cliffs Unit 3 will utilize an Alstom turbine-generator
  - UniStar will submit to the NRC, after the site-specific turbine has been procured, the applicable site-specific turbine rotor data to demonstrate data presented in the U.S. EPR FSAR is bounding (license condition) .
    - ✓ turbine disk rotor specimen test data,
    - ✓ load-displacement data from the compact tension specimens
    - ✓ fracture toughness properties
  - Major rotor inspection intervals are 10 years, so that a total inspection has been completed at least once within a 10 year time period.

Chapter 10, Steam and Power Conversion System

COL Information Items

Steam and Feedwater System Materials

- Flow Accelerated Corrosion (FAC) Program
  - Implement a FAC Program prior to initial fuel loading (license condition), with requirements and recommendations of Generic Letter 89-08 “Erosion/Corrosion-Induced Pipe Wall Thinning”
  - and NSAC-202L-R3 “Recommendations for an Effective Flow Accelerated Corrosion Program.”

Chapter 10, Steam and Power Conversion System
COL Information Items

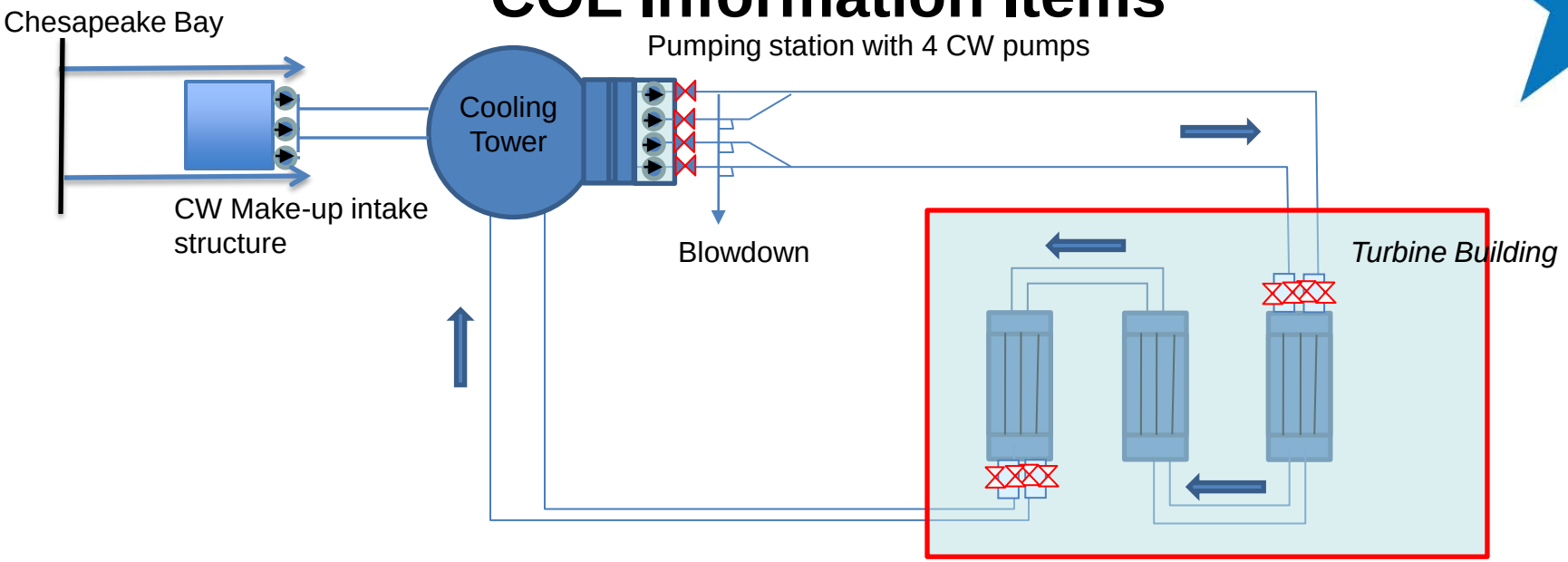
Main condenser

- Condenser
  - Design pressure: 150 psig
  - Test pressure: 225 psig

- Condenser Materials:
  - Titanium tubes and titanium-clad tube sheet.
  - Waterboxes will be lined or coated with a material compatible with the circulating water.
  - Condenser piping expansion joints will be constructed of chlorobutyl elastomer, ethylene-propylene diene monomer (EPDM), or equivalent.

Chapter 10, Steam and Power Conversion System

COL Information Items



- Circulating Water System (CWS) (General Description)
  - Four 25% capacity vertical circulating water pumps delivering a total flow of 800,000 gpm
  - CWS Cooling Tower : Closed-loop brackish water system, plume abated (hybrid) mechanical draft cooling tower.

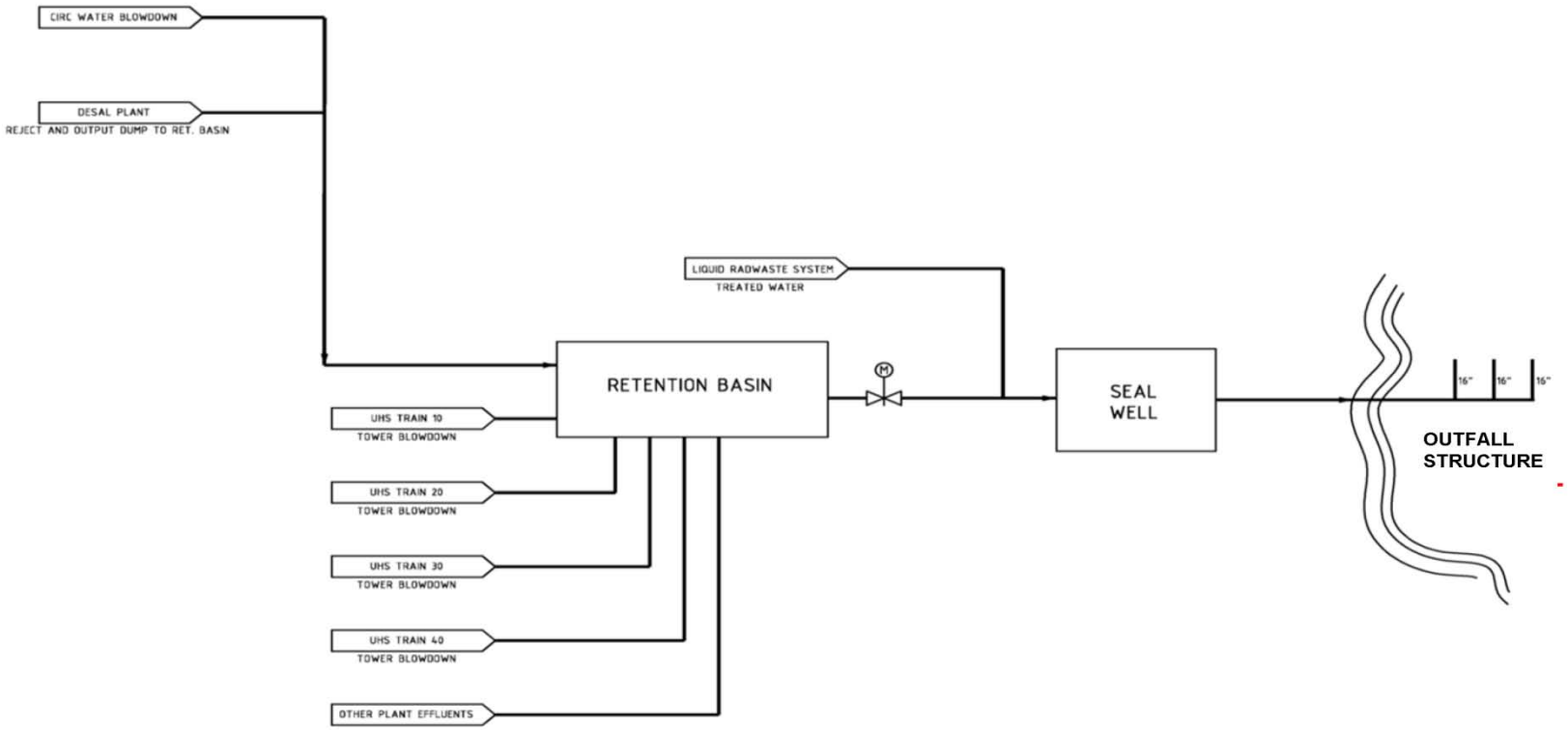
Chapter 10, Steam and Power Conversion System
COL Information Items

Circulating Water System (General description) - continued

- CWS Makeup System :
  - Three 50% capacity vertical CWS Makeup System pumps
  - CWS makeup water from the Chesapeake Bay
    - ✓ Intake structure in a common forebay shared with Ultimate Heat Sink make-up system
    - ✓ The forebay is connected to the Bay via two 60” safety-related pipes
    - ✓ The rest of the structure is independent of UHS Make-up building
- CWS Blowdown System :
  - Discharges to a common retention basin
  - One 30” pipe conveys flow from retention basin to seal well.
  - The water in the seal well is conveyed to the outfall by gravity.
  - CWS outfall structure consists of header and diffusers.

Chapter 10, Steam and Power Conversion System
COL Information Items

Circulating Water System Blowdown



Chapter 10, Steam and Power Conversion System
COL Information Items

Piping

- The CWS piping design pressure is 150 psig.
- The CWS pipe is concrete below ground and carbon steel with a protective lining or coating for the parts above ground.

Vacuum Priming system

- No Vacuum priming system required as the CWS lines are filled and vented using gravity fill from the circulating water pump forebay and pressure fill line with the CWS makeup water system pumps.
- During normal system operation, all the CW lines are under positive pressure.

Chapter 10, Steam and Power Conversion System
COL Information Items

Chemistry of Circulating Water System

- Water quality control focuses on corrosion/scaling control and preventing biofouling.
- Chemicals chosen are compatible with the system wetted surfaces.
  - Biocide, Algaecide, pH adjuster, Corrosion inhibitor, Scale inhibitor, Dispersant, as required for CWS makeup or CWS system chemistry.
- Monitored and analyzed in the condenser cold water inlet and on the seal well before discharge into the outfall.
- Chemicals, parameters and monitoring subject to change to comply with NPDES permit in effect at the time.

Chapter 10, Steam and Power Conversion System
COL Information Items

Flooding Analysis

- No Safety-Related SSCs resides in the Turbine Building.
- In Turbine Building, flood resulting of CW pipe breaks would exit the building through relief siding. The flood flow would direct away from the adjacent structures that house safety-related SSCs by roads, berms and site grading.
- In the yard, the flood flow due to a postulated CWS pipe failure or collapse of the CWS cooling tower basin wall will be directed away from structures that house safety-related SSCs by site grading and the cooling tower yard topography.

Chapter 10, Steam and Power Conversion System
Agenda

COL Information/Interface/Site-Specific Supplemental Information Items

Turbine-Generator

- Rotor Integrity Program

Steam and Feedwater System Materials

- Flow Accelerated Corrosion Program

Circulating Water System

- Condenser pressure and Materials
- CWS general description
- Piping
- Vacuum priming system
- Chemistry of CWS
- Flooding Analysis

Conclusions

Chapter 10, Steam and Power Conversion System
Conclusions

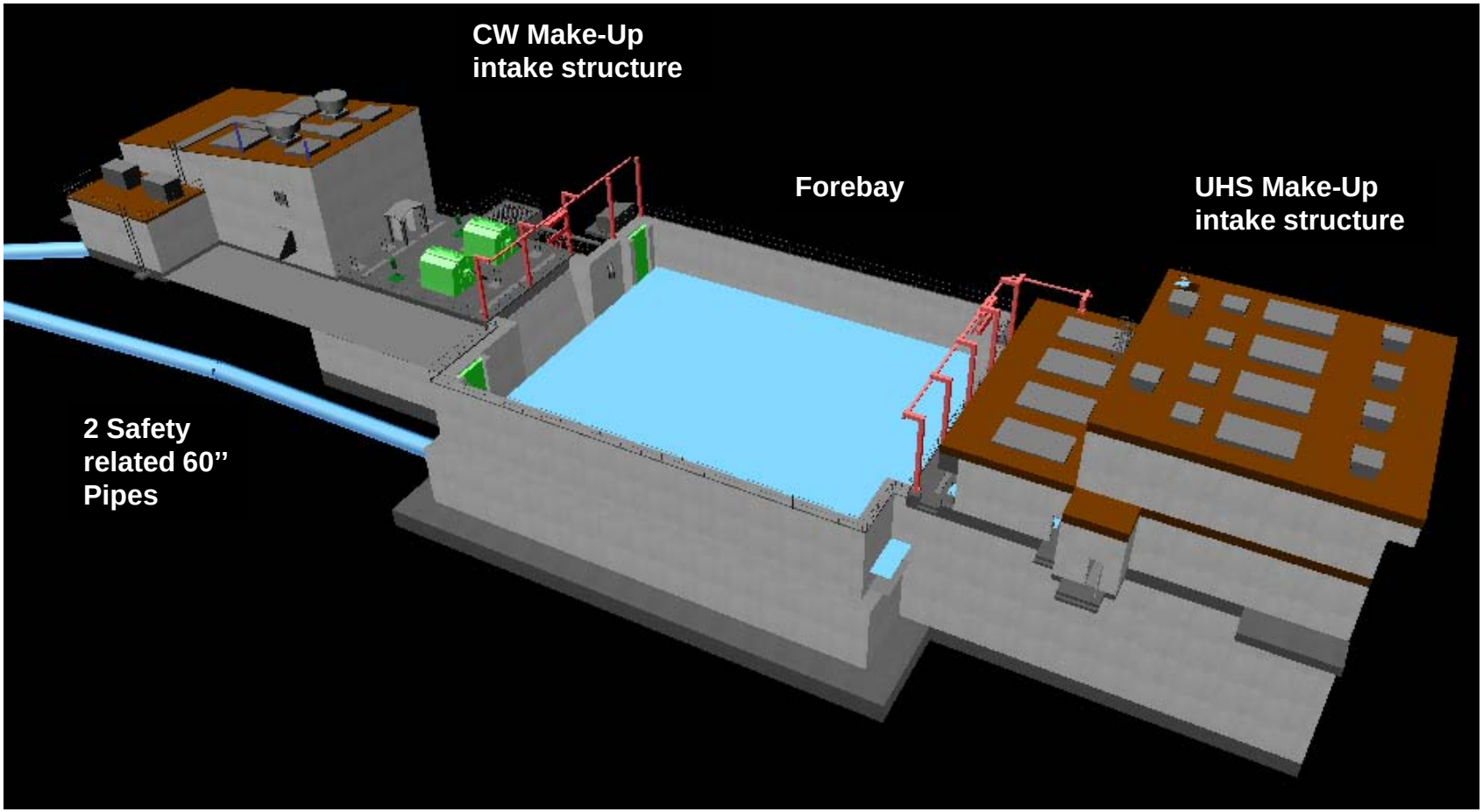
- No ASLB Contentions
- No Departures from the U.S. EPR FSAR Chapter 10 for the Calvert Cliffs Unit 3 COLA.
- Twelve COL Information Items and one Interface Item, as specified by U.S. EPR FSAR, are addressed in Calvert Cliffs Unit 3 FSAR Chapter 10.
- No RAI Responses Pending Submittal.

Acronyms

- ACRS – Advisory Committee on Reactor Safeguards
- ACWS – Auxiliary Cooling Water System
- ASLB – Atomic Safety & Licensing Board
- ASME – American Society For Mechanical Engineers
- CWS – Circulating Water System
- COL – Combined License
- COLA – Combined License Application
- DC – Design Certification
- EDF – Électricité de France
- EPDM – Ethylene-propylene diene monomer
- FAC – Flow Accelerated Corrosion
- FRP – Fiberglass-reinforced plastic
- FSAR – Final Safety Analysis Report
- HDPE – high density polyethylene
- IBR – Incorporate by Reference
- NPDES – National Pollution Discharge Elimination System
- NRC – Nuclear Regulatory Commission
- PVC – Polyvinyl chloride
- RCOLA – Reference COL Application
- SER – Safety Evaluation Report
- SSCs – Structures, Systems and Components
- UHS – Ultimate Heat Sink

Chapter 10, Steam and Power Conversion System

Back-up slide



U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Presentation to the ACRS Subcommittee

UniStar Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3
COL Application Review

Safety Evaluation Report

CHAPTER 10: Steam and Power Conversion Systems

November 30, 2010

Order of Presentation

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

- **Joseph Colaccino** – EPR Projects Branch Chief
- **Surinder Arora** – Calvert Cliffs RCOLA Lead PM
- **UniStar** – RCOL Applicant
- **Peter Hearn** – Chapter 10 PM
- **Devender Reddy** – Chapter 10 Technical Reviewer

Major Milestones Chronology

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

07/13/2007	Part 1 of the COL Application (Partial) submitted
12/14/2007	Part 1, Rev. 1, submitted
03/14/2008	Part 1, Rev. 2, & Part 2 of the Application submitted
06/03/2008	Part 2 of the Application accepted for review (Docketed)
08/01/2008	Revision 3 submitted
08/14/2008	Review schedule presented in a public meeting
03/09/2009	Revision 4 submitted
06/30/2009	Revision 5 submitted
07/14/2009	Review schedule published
09/30/2009	Revision 6 submitted
04/12/2010	Phase 1 review completion milestone
Oct, 2010	Phase 2 reviews complete for Chapters 4, 5, 8, 10, 11, 12, 16, 17 & 19
02/18/2010	ACRS begins Phase 3 review

Staff Review Team

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

- **Technical Staff**
  - **Devender Reddy** - Ch 10 Balance of Plant Branch Reviewer
  - **Gordon Curran** - Ch 10 Balance of Plant Branch Reviewer
  - **Bob Davis** - Ch 10 Component Integrity, Performance and Testing Branch Reviewer
  - **John Honcharik** - Ch 10 Component Integrity, Performance and Testing Branch Reviewer
  - **Edwardo Sastre** - Ch 10 Component Integrity, Performance and Testing Branch Reviewer

Overview of Staff's Review

U.S.NRC
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SRP Section/Application Section		Number of RAI Questions	Number of SE Open Questions
10.2	Turbine Generator	4	0
10.2.3	Turbine Rotor Integrity	0	0
10.3.	Main Steam Supply System	2	0
10.3.6	Steam and Feedwater System Materials	0	0
10.4.1	Main Condensers	1	0
Totals		Continued on next page	Continued on next page

Overview of Staff's Review

U.S.NRC
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SRP Section/Application Section		Number of RAI Questions	Number of SE Open Questions
10.4.2	Main Condenser Evacuation System	1	0
10.4.3	Turbine Gland Sealing System	1	0
10.4.4	Turbine Gland Bypass	0	0
10.4.5	Circulating Water System	1	1
10.4.6	Condensate Polishing System	0	0
Totals		Continued on next page	Continued on next page

Overview of Staff's Review

U.S.NRC
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SRP Section/Application Section		Number of RAI Questions	Number of SE Open Questions
10.4.7	Condensate and Feedwater System	0	0
10.4.8	Steam Generator Blowdown System	0	0
10.4.9	Emergency Feedwater System	3	0
Totals		13	1

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RAI 246, Question 10.04.05-4 - Open Item

Status: Responded – Under NRC Staff review

- In RAI 10.4.5-4, the staff requested additional information on the paths that the flood water would use to exit the turbine building to verify external flooding resulting from a failure in the CWS does not adversely affect safety related SSCs.

- The applicant confirmed that a flood analysis was performed to assess the effect of a flood resulting from a postulated circulating water system pipe failure inside the turbine building and exiting to the yard area. Included in the response is the location of relief siding to allow water to exit the turbine building and descriptions of where it flows upon exiting.

Staff Findings

U.S.NRC
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- **The NRC staff is continuing review of site grading and characteristics related to water exiting the turbine building to verify safety related SSC's are adequately protected from a CWS flooding event.**

Acronyms

U.S.NRC
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- CWS – Circulating Water System
- SSC – Structures, Systems, and Components

UNISTAR NUCLEAR ENERGY

Presentation to ACRS
U.S. EPR™ Subcommittee
Calvert Cliffs Nuclear Power Plant Unit 3
FSAR Chapter 11, Radioactive Waste Management
November 30, 2010

Introduction

- AREVA U.S. EPR FSAR ACRS Meeting for Chapter 11 – Radioactive Waste Management occurred on April 6, 2010.
- Today's presentation was prepared by UniStar and is supported by AREVA (U.S. EPR Supplier)
  - Pedro Perez (AREVA Supervisory Engineer-Radiological Engineering)
- Today, Tim Kirkham, Senior Health Physicist UniStar, will present the Calvert Cliffs Unit 3 FSAR Chapter 11, Radioactive Waste Management
- The focus of today's presentation will be on site-specific information that supplements the U.S. EPR FSAR Chapter 11

Chapter 11, Radioactive Waste Management Agenda

- Radioactive Waste Management
  - COL Information Items
  - Departures from the EPR FSAR
  - Supplemental information
- Conclusions

Chapter 11, Radioactive Waste Management
COL Information Items

- Liquid waste management system cost-benefit analysis for Calvert Cliffs 3
  - Total body (TB)/thyroid (thy) dose benefit to cost ratio is less than 1.0,
    - CC3 dose liquid effluents = 0.159 person-rem/yr (TB), 0.625 person-rem/yr (thy)
      [EPR dose = 0.177 person-rem/yr (TB), 0.682 person-rem/yr (thy)]

- Gaseous waste management system cost-benefit analysis for Calvert Cliffs 3
  - Total body dose benefit to cost ratio of less than 1.0,
    - CC3 dose gaseous effluent = 3.7 person-rem/yr (TB), 3.96 person-rem/yr (thy)
      [EPR dose = 5.52 person-rem/yr (TB), 5.80 person-rem/yr (thy)]

Chapter 11, Radioactive Waste Management COL Information Items

- Describe, at the functional level, elements of the Process Control Program (PCP).
  - Calvert Cliffs Unit 3 will utilize NEI Template 07-10A which has been reviewed and accepted by the staff.

- "Offsite Dose Calculation Manual," will specify how a licensee controls, monitors, and performs radiological evaluations of releases. The program will also document and report radiological effluents discharged to the environment.
  - NEI ODCM Template 07-09A which has been reviewed and accepted by the staff.

Chapter 11, Radioactive Waste Management Departures

LIQUID EFFLUENT DISCHARGE DESIGN

U.S. EPR FSAR states the activity in the effluent is diluted by two potential means prior to reaching a given dose receptor:

- Mixing in the discharge canal
- Mixing /dilution with the receiving body of water prior to reaching the dose receptor

➢ Calvert Cliffs 3:

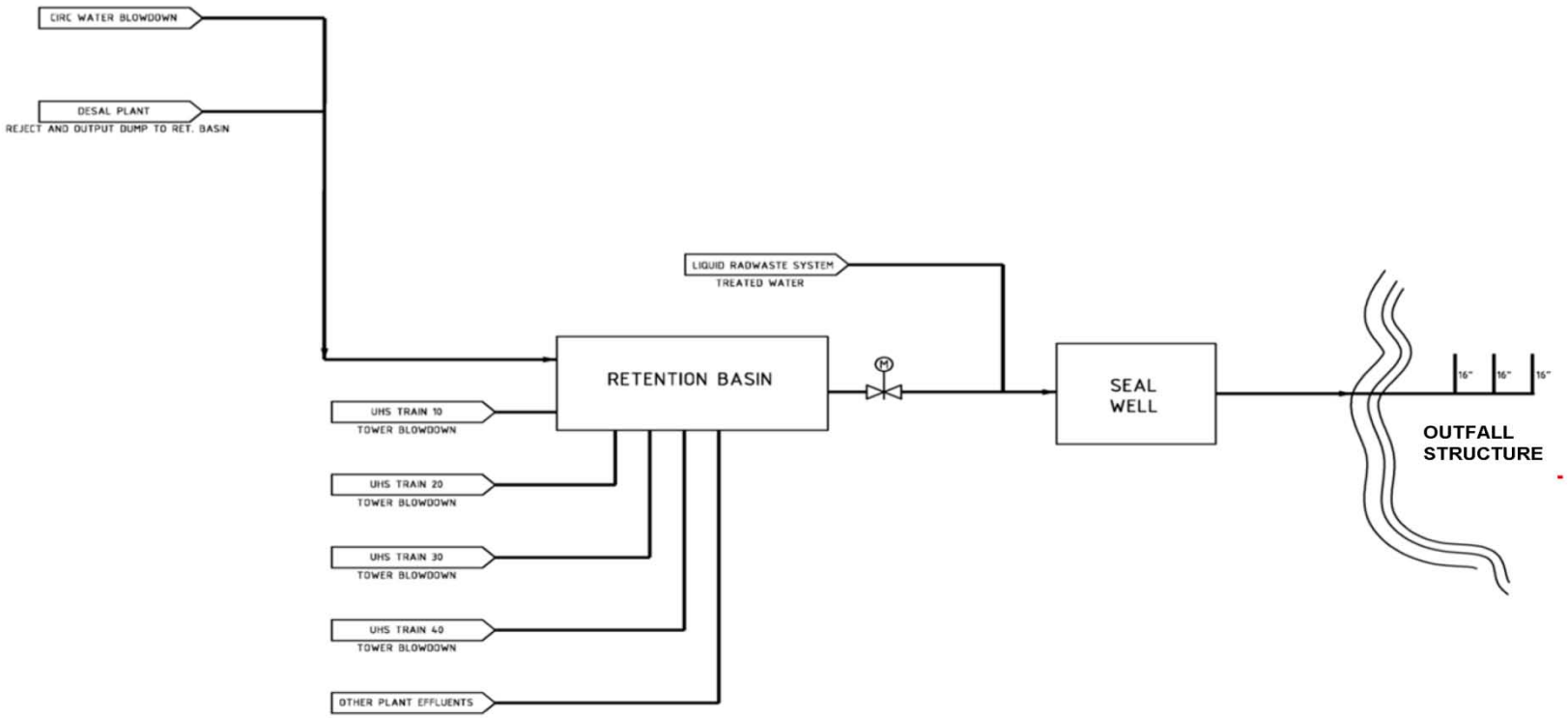
- Treated liquid radwaste effluent released to outfall structure via discharge line downstream of waste water retention basin and upstream of a seal well
- Discharged thru multiport diffuser line 550 feet from shoreline out

➢ Justification

- Meets the design objective of providing a monitored release path for treated liquid radwaste effluent
- Calvert Cliffs 3 conforms with 10CFR50 Appendix I and 10CFR20

Chapter 11, Radioactive Waste Management Departures

Departure (continued)



Chapter 11, Radioactive Waste Management Departures

ESTIMATED DOSES FOR LIQUID AND GASEOUS PATHWAYS

U.S. EPR FSAR describes pathways for exposure that are to be considered for liquid and gaseous exposure

- Calvert Cliffs 3:
  - Due to the brackish nature of the receiving body of water, liquid pathways for irrigation are not considered significant.
  - Milk animals are not considered in the gaseous calculations due there being none within 5 miles.
- Justification
  - Site-specific characteristics are considered in the calculation of liquid and gaseous effluent doses to the maximally exposed individual (MEI) where differences from the U.S. EPR FSAR exist.
  - This Departure is acceptable because the doses meet the 10 CFR Part 50, Appendix I, and ALARA design objectives.

Chapter 11, Radioactive Waste Management Supplemental Items

- Dose from effluents
  - U.S. EPR FSAR uses an effluent dilution flow of 9,000 gpm. The Calvert Unit 3 design flow is 21,000 gpm which lowers the liquid effluent dose.
  - The U.S. EPR FSAR uses an atmospheric dispersion factor of 5.0E-06 sec/m^3 for maximum releases at the site boundary thus bounding any Calvert Cliffs Unit 3 release.
  - For the U.S. EPR FSAR gaseous waste system leak evaluation, a dispersion factor of 1.0E-03 sec/cm^3 which also bounds all accident dispersion factors for Calvert Unit 3.

- Postulated Radioactive Releases due to liquid containing tank failure
  - The U.S. EPR FSAR uses input values that bound the site-specific values for Calvert Cliffs 3.

Chapter 11, Radioactive Waste Management Agenda

- Radioactive Waste Management
  - COL Information Items
  - Departures from the EPR FSAR
  - Supplemental information
- Conclusions

Conclusions

- No ASLB Contentions
- Four COL Information Items, as specified by EPR FSAR, are addressed in Calvert Cliffs Unit 3 FSAR Chapter 11
- Two Departures from EPR FSAR for Chapter 11 of the Calvert Cliffs Unit 3 COL
- One RAI Response Pending Submittal (RAI 259 will be submitted in two weeks)

Acronyms

- ACRS – Advisory Committee on Reactor Safeguards
- ALARA – AS Low As Reasonably Achievable
- ASLB – Atomic Safety & Licensing Board
- COL – Combined License
- COLA – Combined License Application
- DC – Design Certification
- EDF – Électricité de France
- FSAR – Final Safety Analysis Report
- IBR – Incorporate by Reference
- mrem – millirem
- NEI – Nuclear Energy Institute
- NRC – Nuclear Regulatory Commission
- ODCM – Offsite Dose Calculation Manual
- PCP – Process Control Program
- RAI – Request for Additional Information
- RCOLA – Reference COL Application
- SER – Safety Evaluation Report
- SSCs – Structures, Systems and Components
- TB – Total Body
- thy – thyroid
- UHS – Ultimate Heat Sink
- yr – year

U.S.NRC

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Presentation to the ACRS Subcommittee

UniStar Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3
COL Application Review

Safety Evaluation Report

CHAPTER 11: RADIOACTIVE WASTE MANAGEMENT

November 30, 2010

Order of Presentation

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

- **Surinder Arora** – Calvert Cliffs RCOLA Lead PM
- **UniStar** – RCOL Applicant
- **Jay Patel** – Chapter 11 PM
- **Jean-Claude Dehmel** - Chapter 11 Health Physics Branch Reviewer

Staff Review Team

U.S.NRC
United States Nuclear Regulatory Commission
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- **Technical Staff**
  - **Michelle Hart** – Section 11.1
    Siting and Accident Consequences Branch
  - **Jean-Claude Dehmel** – Sections 11.2 to 11.5
    Construction Health Physics Branch (Lead Reviewer)
  - **Joshua Wilson** – Sections 11.2 to 11.4
    Balance of Plant Branch
- **Project Managers**
  - **Surinder Arora** – Lead Project Manager
  - **Jay Patel** – Chapter Project Manager

Overview of Staff's Review

U.S.NRC
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SRP Section/Application Section		Number of RAI Questions	Number of SE Open Questions
11.1	Source Terms	0	0
11.2	Liquid Waste Management System	4	2
11.3	Gaseous Waste Management System	2	1
11.4	Solid Waste Management Systems	1	0
11.5	Process and Effluent Radiological Monitoring and Sampling Systems	2	0
Totals		9	3

COL Review Topics of Interest

Chapter 11 – Radioactive Waste Management

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CCNPP Unit 3 COL Application Review

- COL application contains:
  - Interface Items
  - COL information items
  - Supplemental Information
- COL application identified one departure from the U.S. EPR FSAR:
  - Use of alternate met dispersion parameters in one offshore non-occupied sector
- COL application applies U.S. EPR details as site-specific information:
  - Doses to members of the public from liquid and gaseous releases based on U.S. EPR plant and generic site information
  - Cost-benefit analyses for the liquid and gaseous waste management systems based plant and generic site information
- COL application review included:
  - Commitments of operational programs for the control and monitoring of liquid and gaseous effluents, and management of low-level radioactive waste
  - Confirming that COL information items identified in U.S. EPR FSAR are addressed
  - Determining that COL FSAR provides sufficient details for the staff to confirm regulatory compliance and conduct independent assessments

COL Review Topics of Interest

Section 11.1 – Source Terms

- COL FSAR incorporates by reference FSAR Section 11.1 of the U.S. EPR DCD
- COL information items - N/A
- Supplemental information – N/A
- Departures – N/A
- No staff review required

COL Review Topics of Interest

Section 11.2 – Liquid Waste Management System

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- Interface Requirements
  - ODCM operational program for liquid effluents under FSAR Sections 11.5 and 13.4
  - Postulated radwaste tank failure evaluation under FSAR Section 2.4.13
  - Quality assurance program under FSAR Section 17.5 for the LWMS
  - Modification of FSAR TS 16.5.5.11, given no outdoor radwaste storage tanks
- COL Information Items
  - Site-specific LWMS cost-benefit analysis (CBA)
  - Implementation of a site-specific ODCM as a COL information item in FSAR Section 11.5 for all radioactive effluents
- Supplemental Information
  - FSAR Section 11.2 assumes that the U.S. EPR FSAR CBA is applicable to Calvert Cliffs Unit 3
- Departures
  - Revised FSAR Part 7 states that doses to maximally exposed individuals are bounding for all sites given dose results of U.S. EPR FSAR Section 11.2

COL Review Topics of Interest

Section 11.2 – Liquid Waste Management System

U.S.NRC
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- Result
  - Staff determines that the U.S. EPR CBA is not applicable to Calvert Cliffs Unit 3
  - Staff requests the applicant to conduct a site-specific CBA for Calvert Cliffs Unit 3
  - Staff requests applicant to assess doses from liquid effluent releases and demonstrate compliance with 10 CFR 20.1301 and 20.1302, Part 20, Appendix B ECLs, Part 50 Appendix I design objectives, and 40 CFR Part 190 under 10 CFR 20.1301(e)
  - Staff requests applicant to confirm the endorsement of RG 1.143 QA requirements for those portions of the LWMS that are the responsibility of the COLA
  - Staff requests applicant to revise FSAR Part 7 statement on bounding doses for all sites given plant and site-specific dose results of COL FSAR Section 11.2
  - Staff confirmation of adequacy of RAI responses and independent confirmation of MEI and population doses pending receipt of proposed FSAR revisions
  - Modification of FSAR TS 16.5.5.11 found acceptable given that LWMS design does not include outdoor radwaste storage tanks

COL Review Topics of Interest

Section 11.3 – Gaseous Waste Management System

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- Interface Requirements
  - ODCM operational program for gaseous effluents under FSAR Sections 11.5 and 13.4
  - Quality assurance program under FSAR Section 17.5 for the GWMS
  - FSAR adopts by reference U.S. EPR FSAR TS 16.5.5.11 on GWMS radioactivity monitoring program

- COL Information Items
  - Site-specific GWMS cost-benefit analysis (CBA)
  - Implementation of a site-specific ODCM as a COL information item in FSAR Section 11.5 for all radioactive effluents

- Supplemental Information
  - FSAR Section 11.3 assumes that the U.S. EPR FSAR CBA is applicable to Calvert Cliffs Unit 3

- Departures
  - FSAR Part 7 addresses differences with U.S. EPR FSAR assumptions for atmospheric dispersion parameters in a NE sector located over water for which no residents are expected to reside routinely

COL Review Topics of Interest

Section 11.3 – Gaseous Waste Management System

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- Result
  - Staff determines that the U.S. EPR CBA is not applicable to Calvert Cliffs Unit 3
  - Staff requests the applicant to conduct a site-specific CBA for Calvert Cliffs Unit 3
  - Staff requests applicant to assess doses from gaseous effluent releases and demonstrate compliance with 10 CFR 20.1301 and 20.1302, Part 20, Appendix B ECLs, Part 50, Appendix I design objectives, and 40 CFR Part 190 under 10 CFR 20.1301(e)
  - Staff requests applicant to confirm the endorsement of RG 1.143 QA requirements for those portions of the GWMS that are the responsibility of the COLA
  - The staff finds the applicant FSAR Part 7 departure acceptable on the qualification that no one is expected to reside in the NE sector for extended time periods
  - Staff confirmation of adequacy of RAI responses and independent confirmation of MEI and population doses pending receipt of proposed FSAR revisions

COL Review Topics of Interest

Section 11.4 – Solid Waste Management System

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- Interface Requirements
  - PCP operational program for administrative and operational controls under FSAR Sections 11.2, 11.3, 13.4, and 16
  - Compliance with liquid and gaseous effluent release limits and offsite doses associated with the operation of the SWMS is addressed in FSAR Sections 11.2, 11.3, and 11.5
  - CBA associated with the operation of the SWMS addressed in FSAR Sections 11.2 for the LWMS and 11.3 for the GWMS
  - Quality assurance program under FSAR Section 17.5 for the SWMS
  - Modification of U.S. EPR FSAR TS 16.5.6.2 on effluent release reporting requirements
- COL Information Items
  - Implementation of a plant-specific PCP by adopting NEI 07-10A, Generic FSAR Template Guidance for Process Control Program (PCP), for the management of low-level radioactive wastes
- Supplemental Information
  - FSAR adopts NEI 07-10A, Generic FSAR Template Guidance for Process Control Program (PCP)
- Departures
  - There are no departures associated with the SWMS

COL Review Topics of Interest

Section 11.4 – Solid Waste Management System

U.S.NRC
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- Result
  - Staff requests applicant to identify administrative measures and arrangements for the long-term storage of Class B and C low-level wastes (LLW) beyond the built-in storage capacity (~8 years) of the Radwaste Processing Building
  - Staff requests applicant to confirm compliance with NRC regulations for the identified LLW storage options and arrangements with third parties for Class B and C LLW generated by Calvert Cliffs Unit 3
  - Applicant proposes to consider access to disposal and storage facilities, as available, constructing an onsite interim storage facility, and establishing commercial agreements with third parties to process, store, take ownership, and dispose of LLW generated by Calvert Cliffs Unit 3
  - The staff found the proposed options and commitments to meet NRC regulations and guidance and requirements of other Federal, State and local agencies acceptable
  - The staff finds the applicant revised FSAR TS16.5.6.2 acceptable in deleting the reporting requirements for sites with multiple operating units
  - Staff requests applicant to confirm the endorsement of RG 1.143 QA requirements for those portions of the SWMS that are the responsibility of the COLA
  - Staff finds adoption of NEI 07-10A PCP Generic FSAR Template acceptable

COL Review Topics of Interest

Section 11.5 – Process and Effluent Radiological Monitoring and Sampling Systems

U.S.NRC
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- Interface Requirements
  - ODCM operational program for administrative and operational controls under FSAR Sections 11.2, 11.3, 13.4, and 16
  - ODCM used in demonstrating compliance with liquid and gaseous effluent release limits and offsite doses associated with the operation of the LWMS, GWMS, and SWMS, as described in FSAR Sections 11.2, 11.3, and 11.4
- COL Information Items
  - Implementation of a plant and site-specific ODCM by adopting, NEI 07-09A, Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program description, in monitoring and controlling all radioactive effluent releases
- Supplemental Information
  - FSAR adopts NEI 07-09A, Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program description
- Departures
  - There are no departures associated with the PERMSS

COL Review Topics of Interest

Section 11.5 – Process and Effluent Radiological Monitoring and Sampling Systems

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- Result
  - Staff requests the applicant to identify administrative measures and arrangements on how the ODCM will control all liquid and gaseous effluent releases and doses to members of the public given that UniStar and Constellation will contribute to and share dose allocations under 10 CFR 20.1301, 20.1302, and 20.1301(e), and unity rule in complying with ECLs of Appendix B to Part 20
  - UniStar proposes arrangements with Constellation to coordinate and control all releases such that both licensees jointly manage and plan all releases in compliance with NRC regulations
  - The applicant states that such arrangements have not yet been established between UniStar and Constellation
  - The staff found UniStar's proposed commitments and integration of these arrangements with Constellation acceptable
  - The implementation of the ODCM and procedures are a required license condition milestone, with completion before fuel load
  - Staff finds adoption of NEI 07-09A ODCM Generic FSAR Template and proposed ODCM modification acceptable
  - The staff finds the applicant revised FSAR TS 16.5.6.1acceptable in deleting the reporting requirements for sites with multiple operating units

Staff Findings (1/2)

U.S.NRC
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The COL FSAR for Calvert Cliffs Unit 3 Provides:

- With the closure of open and confirmatory items, the applicant is expected to comply with 10 CFR 20.1301 and 20.1302, Part 20, Appendix B ECLs, Part 50, Appendix I design objectives, and 40 CFR Part 190 (under 10 CFR 20.1301(e)) limits on liquid and gaseous effluent releases, doses to the public, and ALARA provisions
- The adoption of the NEI 07-10A PCP Template is acceptable in complying with regulations of the NRC and other Federal, State, and local agencies in processing, preparing, storing, packaging, shipping, and disposing of LLW
- The proposed LLW management options are acceptable, including access to disposal and storage facilities, if available, constructing an onsite interim storage facility, and establishing commercial agreements with third parties to process, store, take ownership, and dispose of LLW generated by Calvert Cliffs Unit 3

Staff Findings (2/2)

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The COL FSAR for Calvert Cliffs Unit 3 Provides:

- The adoption of NEI 07-09A ODCM Template is acceptable in complying with NRC regulations and guidance in monitoring and controlling liquid and gaseous effluent releases and doses to members of the public
- The commitment to modify and supplement NEI 07-09A ODCM Template with procedures is acceptable in ensuring that UniStar and Constellation jointly comply with NRC regulations and guidance in monitoring and controlling liquid and gaseous effluent releases and doses to members of the public
- The implementation of the NEI 07-10A PCP and a modified NEI 07-09A ODCM is a license condition, with completion before fuel load

Acronyms

- **ALARA** – As Low As is Reasonably Achievable
- **CBA** – Cost-Benefit Analysis
- **COL** – Combined License
- **ECL** – Effluent Concentration Limit
- **FSAR** – Final Safety Analysis Report
- **GDC** – Generic Design Criteria
- **GWMS** – Gaseous Waste Management System
- **HEPA** – High Efficiency Particulate Air
- **LLW** – Low-Level Waste
- **LWMS** – Liquid Waste Management System
- **MEI** – Maximally Exposed Individual
- **ODCM** – Offsite Dose Calculation Manual
- **PCP** – Process Control Program
- **RAI** – Request for Additional Information
- **RCS** – Reactor Coolant System
- **RG** – Regulatory Guide
- **SER** – Safety Evaluation Report
- **SRP** – Standard Review Plan
- **SWMS** – Solid Waste Management System
- **TS** – Technical Specifications

UNISTAR NUCLEAR ENERGY

Presentation to ACRS
U.S. EPR™ Subcommittee
Calvert Cliffs Nuclear Power Plant Unit 3
FSAR Chapter 16
Technical Specifications
November 30, 2010

Chapter 16, Technical Specifications
Introduction

- Today's presentation was prepared by UniStar and is supported by AREVA (U.S. EPR Supplier).
- AREVA - ACRS Meeting for U.S. EPR FSAR Chapter 16, Technical Specifications, occurred on April 6, 2010.
- Today Roger Scott, UniStar Regulatory Affairs Engineer, will present the Calvert Cliffs Unit 3 FSAR Chapter 16 and COLA Part 4.
- Technical Support will be provided by Robert Sharpe, (AREVA – Advisory Engineer, New Plants Engineering).
- The focus of today's presentation will be on Plant-Specific Technical Specifications (PTS) that supplement the U.S. EPR FSAR Generic Technical Specifications (GTS).

Chapter 16, Technical Specifications
Agenda

- Chapter 16, Technical Specifications
  - COL Information Item
  - Supplemental Information
  - Departures & Exemptions
- Conclusions

Chapter 16, Technical Specifications
COL Information

COL Information Item# 16.0-1

- Requires a COL applicant to provide information in response to Reviewer's Notes and to replace preliminary information provided in brackets within the TS and Bases with plant specific values

The COL Item is addressed as follows:

- The U.S. EPR Generic Technical Specifications and Bases (GTS) are incorporated by reference in COLA Chapter 16
- Differences from the GTS are presented in COLA Part 4
- A complete set of PTS will be included in COLA Part 4 after the U.S. EPR Chapter 16 SER with no open items is issued by the NRC

Chapter 16, Technical Specifications
Supplemental Information

- Addresses Reviewer's Notes and bracketed items as required
- Adds site-specific information for:
  - Ultimate Heat Sink Makeup Water System
    - Defines OPERABLE emergency makeup water source
  - Post Accident Monitoring Instrumentation
    - Essential Service Water System Cooling Tower Basin Level

Chapter 16, Technical Specifications
Departures/Exemptions from GTS

- Design information regarding Toxic Gas Detection and Isolation is removed in PTS
  - Site-specific evaluation (provided in Section 2.2.3) concludes that there are no credible events that would require Toxic Gas Detection and Control Room Envelope Isolation
- Setpoint Control Program is added to the Administrative Programs section of the GTS, in lieu of providing Limiting Trip Setpoints and Design Limits
  - SER open items addressed in response to RAI 260, dated 11/19/10

Chapter 16, Technical Specifications
Departures/Exemptions from GTS

- **Interim Staff Guidance (ISG-08)**, “Necessary Content of Plant-Specific Technical Specifications [PTS] When a Combined License Is Issued”
  - COL applicants shall resolve all GTS COL items before COL issuance.
  - The PTS that are issued with the COL are required to be complete
  - An applicant may resolve this requirement by proposing an administrative control program

Chapter 16, Technical Specifications
Departures/Exemptions from GTS

ISG-08, Option 3: Administrative Control Program

- The following site-specific items are addressed with the Setpoint Control Program (SCP):
  - Protection System reactor trip and engineered safety feature setpoints relocated to SCP
  - TS Surveillances are revised to reference the SCP
  - Setpoint Control Program added to PTS
- Setpoint Control Program (SCP) based on NRC reviewed and approved methodologies

Chapter 16, Technical Specifications
Agenda

- Chapter 16, Technical Specifications
  - COL Information Item
  - Supplemental Information
  - Departures & Exemptions
- Conclusions

Chapter 16, Technical Specifications
Conclusions

- No ASLB Contentions
- One COL Information Item, as specified by U.S. EPR FSAR, is addressed in Calvert Cliffs Unit 3 FSAR Chapter 16
- No RAI Responses Pending Submittal

Acronyms

- ACRS – Advisory Committee on Reactor Safeguards
- ASLB – Atomic Safety and Licensing Board
- COL – Combined License
- COLA – Combined License Application
- FSAR – Final Safety Analysis Report
- GTS – Generic Technical Specifications
- IBR – Incorporate by Reference
- NRC – Nuclear Regulatory Commission
- PTS – Plant-specific Technical Specifications
- RCOLA – Reference COL Application
- SCP – Setpoint Control Program
- SER – Safety Evaluation Report
- SSC – Structures, Systems, and Components
- UHS – Ultimate Heat Sink

U.S.NRC

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Protecting People and the Environment

Presentation to the ACRS Subcommittee

UniStar Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3
COL Application Review

Safety Evaluation Report

CHAPTER 16: Technical Specifications

November 30, 2010

Order of Presentation

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

- **Surinder Arora** – Calvert Cliffs RCOLA Lead PM
- **UniStar** – RCOL Applicant
- **Peter Hearn** – Chapter 16 PM
- **Joe DeMarshall** - Chapter 16 Technical Specifications Branch Reviewer

Staff Review Team

U.S.NRC
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- **Technical Staff**
  - **Hien Le**
    Technical Specifications Branch Reviewer
  - **Joe DeMarshall**
    Technical Specifications Branch Reviewer
  - **Derek Scully**
    Technical Specifications Branch Reviewer
- **Project Managers**
  - Surinder Arora
  - Peter Hearn

Overview of Staff's Review

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SRP Section/ Application Section		Site Specific Yes/No	Number of RAI Questions	Number of SE Open Questions
16.1	Use and Application	No	0	0
16.2	Safety Limits	No	0	0
16.3.0	LCO and SR Applicability	No	0	0
16.3.1	Reactivity Control System	No	0	0
16.3.2	Power Distribution Limits	No	0	0
Totals			Continued on Next page	Continued on Next page

Overview of Staff's Review (cont'd)

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SRP Section/ Application Section		Site Specific Yes/No	Number of RAI Questions	Number of SE Open Questions
16.3.3	Instrumentation	Yes	19	1
16.3.4	Reactor Coolant System	No	0	0
16.3.5	Emergency Core Cooling System	No	0	0
16.3.6	Containment Systems	No	0	0
16.3.7	Plant Systems	Yes	0	0
Totals			Continued on Next page	Continued on Next page

Overview of Staff's Review (cont'd)

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SRP Section/ Application Section		Site Specific Yes/No	Number of RAI Questions	Number of SE Open Questions
16.3.8	Electrical Power Systems	No	2	0
16.3.9	Refueling Operations	No	0	0
16.4	Design Features	Yes	0	0
16.5	Administrative Controls	Yes	0	0
Totals			21	1

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Description of Open Items

- RAI 260, Question 16-22 was issued as a follow-up RAI for the applicant to provide the additional information necessary for the staff to conclude that the PTS, Administrative Controls, Setpoint Control Program Specification contains sufficient and appropriate details to ensure regulatory compliance with the requirements of 10 CFR 50.36(c)(1)(ii)(A).

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Setpoint Controls Program

- Plant-specific setpoint information cannot be obtained prior to COL issuance because instrumentation uncertainties used in setpoint calculations would not ordinarily be determined until after completion of the detailed design.
- Uncertainty determinations rely upon supporting information such as equipment selection, as-built configuration, and system test results.

COL Review Topics of Interest

Section 16.3.3 - Instrumentation

Setpoint Controls Program (cont'd)

- COL applicants must complete site-specific TS information in the plant-specific TS in accordance with DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications When a Combined License Is Issued," prior to COL issuance using one of three options:
  - Option1 provides site-specific TS information (plant-specific setpoint values – cannot do before COL issuance).
  - Option 2 provides useable bounding information (values that bound the plant-specific setpoint values, but by which the plant may be safely operated).
  - Option 3 relocates site-specific information to a licensee-controlled document and establishes an administrative control TS that requires determining the information using an NRC-approved methodology and that controls changes to the information.

COL Review Topics of Interest

Section 16.3.3 - Instrumentation

Setpoint Controls Program (cont'd)

- UniStar has proposed an Administrative Controls Technical Specification for a Setpoint Control Program to satisfy 10 CFR 50.36(c)(1)(ii)(A) in lieu of specifying explicit values for the Limiting Safety System Settings in the PTS (Option 3).
- The SCP is a Departure from the EPR GTS that will require staff approval via an exemption from the future Design Certification Rule.

COL Review Topics of Interest

Section 16.3.3 - Instrumentation

Setpoint Controls Program (cont'd)

- The proposed SCP TS is currently written to support protection functions implemented via conventional analog bistables. Analog bistables are not utilized in the digital U.S. EPR Protection System.
- Revisions to the SCP TS are necessary to ensure that the specification is implementable and that it accurately reflects the surveillance testing strategy proposed for the digital U.S. EPR Protection System (i.e., performance of calibrations limited solely to those analog components subject to drift). (RAI 260, Question 16-22).

Staff Findings

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The COL FSAR for Calvert Cliffs Unit 3 Provides:

- The staff's review confirmed that the COL applicant addressed the required information relating to technical specifications (TS) with the exception of the identified open item.

- The COL applicant is expected to address the outstanding information in the COL plant-specific TS.

Acronyms

U.S.NRC
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- **GTS** – Generic Technical Specifications
- **PTS** – Plant-Specific Technical Specifications
- **LCO** – Limiting Condition of Operation
- **SR** – Surveillance Requirement