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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

+ + + + +

ESBWR SUBCOMMITTEE

+ + + + +

TUESDAY

JULY 21, 2009

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ROCKVILLE, MARYLAND

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The Subcommittee met in Room T2-B-3 at the Nuclear Regulatory Commission Headquarters, 11545 Rockville Pike, at 8:30 a.m., Michael L. Corradini, Chairman, presiding.

SUBCOMMITTEE MEMBERS PRESENT:

MICHAEL L. CORRADINI, Chair

J. SAM ARMIJO

SAID ABDEL-KHALIK

CONSULTANTS TO THE SUBCOMMITTEE PRESENT:

THOMAS S. KRESS

GRAHAM B. WALLIS

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DESIGNATED FEDERAL OFFICIAL:

CHRISTOPHER BROWN

NRC STAFF PRESENT:

TOM KEVERN

MICHAEL EUDY

NEIL RAY

CHANG LI

DEVENDER REDDY

GEORGE GEORGIEV

EDUARDO SASTRE

ILKA BERRIOS

JEAN-CLAUDE DEHMEL

CHARLES HINSON

BOB RADLINSKI

LARRY WHEELER

JOHN SEGALA

EUGENE EAGLE

EDWARD McCANN

DENNIS ANDRUKAT

ALSO PRESENT:

RICK WACHOWIAK

TOM HICKS

GINA BORSH

STEVE ETHERTON

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DAVID PIEPMEYER

ALSO PRESENT (Con't.):

GARY ANTHONY

SHARAD JHA

FROSTIE WHITE

MARVIN SMITH

MARK PAUL

MIKE ARCARO

DAVE DAVENPORT

JOHN WEDDELL

DOUG KEMP

JAY SUNDBERG

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

4 (8:31 a.m.)

5 CHAIR CORRADINI: Okay, the meeting will
6 come to order. This is a meeting of the North Anna
7 Construction Operating License Subcommittee. My name
8 is Mike Corradini, Chair of the North Anna COLA
9 Subcommittee.

10 ACRS members in attendance today on this
11 beautiful summer day are Said Abdel-Khalik, Sam
12 Armijo, and our consultants Tom Kress and, somewhere
13 lurking, Graham Wallis, I think.

14 Christopher Brown of the ACRS staff is the
15 designated Federal Official of this meeting.

16 The purpose of the meeting is to review
17 and discuss Chapters 5 and 9 through 16 of the Staff's
18 Draft Safety Evaluation Report with open items and
19 associated documents. We will hear presentations from
20 the representatives of the Office of Nuclear
21 Regulatory Reactor Regulation and the Applicant,
22 Dominion.

23 The subcommittee will gather information,
24 analyze relevant issues, and fact, and formulate
25 proposed positions and actions, as appropriate for

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1 deliberation by the full committee.

2 The rules for participation in today's
3 meeting were announced as part of the notice of the
4 meeting, previously published in The Federal Register
5 on July 2, 2009. We have received no requests from
6 members of the public wishing to make an oral
7 statement.

8 A transcript of the meeting is being kept
9 and will be made available as stated in The Federal
10 Register notice. Therefore, we request that the
11 participants in the meeting use the microphones
12 located throughout the meeting room when addressing
13 the committee. They should first identify themselves
14 and speak with sufficient clarity and volume so they
15 can be readily heard.

16 Also, I understand the bridge line is open
17 and so as GEH folks may get questions, they need their
18 colleagues back in other parts of the country. They
19 can call them up.

20 We will now proceed with the meeting. I
21 guess Tom Kevern will lead us off from the Office of
22 New Reactors to introduce the presenters and make
23 opening statements. Tom.

24 MR. KEVERN: Good morning. Thank you Dr.
25 Corradini.

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1 I would like to start out with a brief
2 overview with respect to the staff for today's and
3 tomorrow's presentations. This is a follow along to
4 the meeting to the meeting we had on June 18th. And
5 we are nearing the end of our evaluation of the North
6 Anna Application for license. We presented at the
7 last meeting the chapters you see on the screen.
8 Today we are going to cover the chapters that Dr.
9 Corradini mentioned. And then a one and final time,
10 we will have a subcommittee on August 21st and we will
11 cover the three remaining chapters.

12 For the presentations today, both the
13 Dominion's and the staff's, the application you are
14 addressing which was updated, Revision 1, in December
15 of 2008 and that application incorporates by reference
16 Revision 5 of the Design Control Document, the ESBWR
17 that was submitted to the staff about a year ago, as
18 well as documentation associated with an Early Site
19 Permit that was granted by the Commission in November
20 of 2007.

21 Also for the staff's presentations today,
22 if possible, we will provide an update for Dominion's
23 responses to RAIs that were received subsequent to
24 December of 2008 when Revision 1 was submitted. So,
25 the review process continues and we will provide an

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1 update, as possible.

2 The presentation today, each of the
3 chapters will follow the same format. We start out
4 with Dominion providing a summary of the content of
5 their application, primarily the FSAR and then to be
6 followed by the staff's summary presentation of our
7 safety evaluation report with any open items.

8 We have one staff item, what we consider
9 one lesson learned from the June 18th meeting and that
10 is the staff did not adequately explain, I guess is
11 the best verb here, our process for evaluating
12 material that is incorporated by reference in the COL
13 application from the design control document. And so
14 I would like to do this and address this in a two part
15 process.

16 The first is the first bullet you see on
17 the slide here and that is an excerpt from the
18 language we have in each section of our safety
19 evaluation report wherein there is some material that
20 is incorporated by reference from the DCD. We note
21 that the staff reviewed whatever section or
22 appropriate parts of the FSAR and then checked the DCD
23 to ensure that the sum total of all information, i.e.,
24 that provided in the application as well as what we
25 provided in the DCD is sufficient for the staff to

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1 reach its reasonable assurance finding.

2 The action verb "checked" may or may not
3 mean much to -- well, it could mean a lot of things to
4 a lot of different people. But it was a consensus
5 word that the staff selected to mean that we went back
6 to the DCD, looked at what was there, referenced and
7 reviewed the applicable requirements and criteria,
8 primarily the staff's SRP, and determined that there
9 was adequate information provided.

10 That said, it is still a statement of fact
11 that is open to interpretation by different readers.
12 So, in today's presentation, in support of that
13 paragraph, I go down to the second bullet and we are
14 going to provide a number of examples today in the
15 presentations on the different sections to explain how
16 we did that. And hopefully, we will end up with a
17 better and more complete explanation to ACRS members
18 that our evaluation is complete and we were not just
19 taking the word of the applicant, that we did an in-
20 depth review to whatever degree of detail was
21 appropriate.

22 MEMBER ARMIJO: When you did this
23 checking, did you find problems? Did you find errors
24 or things that just didn't fit?

25 MR. KEVERN: Yes, is the short answer.

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1 And I hope the examples today -- the best example that
2 I can give you off the top of my head is the one in
3 Chapter 3, which will not be presented until August.
4 But there in the example is in-service inspection and
5 in-service testing, two operational programs where
6 there was, in the staff's opinion there was incomplete
7 information to fully describe the program and to
8 explain the milestones. And we went back and looked
9 in the DCD. It wasn't there, in our opinion. And we
10 looked in the application. It wasn't there. And we
11 identified that as a Request for Additional
12 Information.

13 Some time later, both the applicant, the
14 design certification and the applicant to the COL got
15 together and provided us an integrated response and
16 actually provided additional information in both the
17 DCD and in the FSAR to address the staff's concerns.

18 Now, there are other examples but that one
19 was the most comprehensive that you will hear in
20 August.

21 MEMBER ARMIJO: Okay, thank you.

22 MR. KEVERN: Other questions? Okay, we
23 are ready to start Chapter 5, then. And Mike Eudy is
24 the project manager. We will start off on Chapter 5.
25 I'm sorry. He will be the one starting off on

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1 Chapter 5 but first we are going, of course, to
2 Dominion's presentation.

3 MS. BORSH: Good morning. I am Gina Borsh
4 from Dominion. We will talk about Chapter 5 first.
5 Go to the next slide, Mike, as soon as you are ready.

6 Like we did before, we highlight on the
7 first slide of each chapter the sections of the DCD
8 where we added additional supplemental information to
9 the content of the DCD to make a complete COLA. And
10 for Chapter 5, Reactor Coolant System and Connected
11 Systems, we added information to all three sections of
12 the DCD: Integrity of the Reactor Coolant Pressure
13 Boundary, Reactor Vessel, and Component and Subsystem
14 Design.

15 Section 5.2 of the DCD, we incorporated
16 the DCD by reference in the COLA and then in Section
17 5.2 which talks about the integrity of the reactor
18 coolant pressure boundary, we identified the ASME
19 Codes that we are going to be applying to the pre-
20 service and in-service inspection and testing programs
21 for North Anna.

22 As we described in Section 5.2.4 of the
23 COLA, the pre-service and in-service inspection of the
24 reactor coolant pressure boundary will be conducted in
25 accordance with the applicable additional and addenda

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1 of the ASME boiler pressure vessel Code Section 11, as
2 required by 10 C.F.R. 50.55(a).

3 The DCD Section 3.9.6 covers pumps and
4 valves and DCD Section 3.9.3.7.1 covers dynamic
5 restraints. And in those sections, the DCD explains
6 the pre-service and in-service testing of the reactor
7 coolant pressure boundary components will be performed
8 in accordance with the ASME OM code as required by
9 50.55(a).

10 For the next standard supplemental item,
11 we referenced Reg Guide 1.192, which contains the
12 applicable code cases that we are allowed to use that
13 have been endorsed by the NRC for use in our nuclear
14 power plant applications and we committed to using
15 only those code cases.

16 For the last item here, we added a
17 statement that all the Class 1 austenitic or
18 dissimilar metal welds are included in the referenced
19 certified design and that there are not any outside of
20 the scope of the DCD.

21 We are still at 5.2. We added, to address
22 the COL item, we provided the pre-service and in-
23 service inspection and testing program descriptions.
24 This is similar to what Tom was talking about earlier.
25 Actually Chapters 3, 5, and 6 of the DCD and the COLA

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1 contain information about the pre-service and in-
2 service inspection.

3 MEMBER ARMIJO: I just had a question
4 about your Class 1 austenitic stainless steel welds.

5 The North Anna is going to put a hydrogen
6 system --

7 MS. BORSH: Hydrogen water chemistry?

8 MEMBER ARMIJO: Yes.

9 MS. BORSH: Yes.

10 MEMBER ARMIJO: -- which is not in the
11 DCD.

12 MS. BORSH: Right.

13 MEMBER ARMIJO: I presume it has got
14 stainless steel welds in that hydrogen system that is
15 going to hook up to the plant.

16 Now, are the same codes and standards
17 going to be applied to that hydrogen skid or whatever
18 that equipment is to make sure it is compatible with
19 this statement? Because there is going to be -- that
20 is not in the DCD but it is a new system that is part
21 of the pressure boundary, I am sure.

22 MR. HICKS: Yes, I don't think it is in
23 the boundary of the ASME class, is it?

24 MEMBER ARMIJO: I don't know. I am asking
25 to try to understand.

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1 MS. BORSH: Are you asking about what
2 codes and standards we are going to apply to hydrogen
3 chemistry systems?

4 MEMBER ARMIJO: Right, which I would
5 assume would be the same level of quality as you would
6 have for your primary system.

7 MR. HICKS: Well, the system is not in the
8 scope of the DCD. And there aren't any systems that
9 are outside of the scope that are in ASME class 1, 2,
10 or 3 boundaries. So the hydrogen water chemistry
11 system where it connects is outside Class 1, 2, and 3
12 boundaries. So, it wouldn't even apply to that
13 system. Right? We can check and make sure.

14 MEMBER ARMIJO: If you can come back and
15 explain why that is okay, I would appreciate it.

16 MR. EUDY: We actually have a discussion
17 in Chapter 9 that covers the hydrogen water chemistry.

18 MEMBER ARMIJO: Okay. I may take a look
19 at it later.

20 MR. EUDY: Maybe you could follow up with
21 that as well. That will be this afternoon.

22 MS. BORSH: May I call a friend?

23 (Laughter.)

24 MS. BORSH: Steve, are you on the line?
25 Steve Etherton?

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1 MR. ETHERTON: Yes, Gina.

2 MS. BORSH: Would you mind checking with
3 your GE subject matter expert, or is there someone
4 there that could answer the question now, or would you
5 all like to defer and get back with the ACRS?

6 MR. ETHERTON: Yes, let's get back with
7 you. I think we have got someone lined up to address
8 that topic during the Chapter 9 section.

9 MR. HICKS: Well that's also a code
10 question, too.

11 MS. BORSH: Right, yes. Well, it is what
12 codes and it may or may not be the ASME code but yes.

13 MEMBER ARMIJO: Well, this statement says
14 that all of these welds are --

15 MR. HICKS: The Class 1 welds.

16 MEMBER ARMIJO: -- in the DCD. And I
17 don't know why the welds in the hydrogen water
18 chemistry system or at least the attachments wouldn't
19 be Class 1.

20 MS. BORSH: Class 1, yes.

21 MEMBER ARMIJO: So, I am confused.

22 MR. HICKS: We will find out why that is.

23 MS. BORSH: So, Steve, we will follow up
24 with you on that.

25 MR. ETHERTON: Okay.

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1 MS. BORSH: Okay, thank you.

2 All right, so we will go to the next
3 slide.

4 All right. In Section 5.2 we also provide
5 pre-service and in-service inspection in testing
6 program descriptions as we were talking about earlier.

7 This includes a commitment that the initial programs
8 will incorporate the latest addition and addenda of
9 the ASME code that is approved in 10 C.F.R. 50.55(a)
10 on the date 12 months prior to initial fuel load.

11 Then we described the NDE accessibility
12 plan for the components that aren't included in DCD.
13 And the commitment here is that we are going to
14 preserve the accessibility to the piping systems so
15 that we can perform NDE of the Class 1 austenitic and
16 dissimilar metal welds during our in-service
17 inspection activities.

18 And then finally for Section 5.2, we
19 described the procedures that operators are going to
20 be using for leak detection monitoring.

21 Section 5.3 is Reactor Vessel. Here we
22 added a commitment in the COLA that we will be -- that
23 the pressure temperature limit curves are going to be
24 developed in accordance with our Pressure Temperature
25 Limit Report, which is also discussed in Technical

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1 Specifications. We will be talking about that
2 tomorrow.

3 We submitted the PTLR in June to NRC for
4 approval and right now it is under NRC review.

5 Then we addressed another COL item by
6 providing a description of the reactor vessel material
7 surveillance program. And we added a commitment to
8 develop and implement operations procedures to ensure
9 compliance with tech specs and the limits that are in
10 the pressure-temperature limit curves.

11 Section 5.4, we added a couple of
12 commitments here. One is that we are going to
13 implement a human factors analysis for the control
14 room displays and controls for the RCS vents. And we
15 also added a commitment that we are going to be
16 developing and implementing the operating procedures
17 that will prevent severe water hammer and also that
18 will govern use of the reactor vent system.

19 In Chapter 5 we have --

20 CONSULTANT WALLIS: Do you know how to
21 prevent severe water hammer?

22 MS. BORSH: Well, it is in the design of
23 the system itself. And then we do testing and
24 activities to confirm that the equipment is working.

25 CONSULTANT WALLIS: You do testing?

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1 MS. BORSH: Well, to make sure the
2 equipment is working as it is designed. But GE
3 designed prevention of water hammer into the system.

4 CONSULTANT WALLIS: Yes, you just have the
5 procedures that you --

6 MS. BORSH: Right, that we will implement.

7 CONSULTANT WALLIS: Okay.

8 MS. BORSH: Rick, do you want to add
9 anything to that?

10 MR. WACHOWIAK: What you are governing is
11 the procedures for how you would operate the system so
12 that you would avoid having the possibility for water
13 hammer. That is what you are discussing.

14 CONSULTANT WALLIS: Right. And GE has
15 already set the criteria that they have to meet,
16 presumably.

17 MR. WACHOWIAK: That's true, yes.

18 MS. BORSH: We have two open items in
19 Chapter 5. One --

20 MEMBER ABDEL-KHALIK: In Section 5.2,
21 where you talk about the procedures for operators,
22 that the operators use for leak detection monitoring,
23 what is the accuracy of the leak detection monitoring
24 system?

25 MS. BORSH: I think that we are using --

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1 the tech specs have some limits. Let me look at this
2 real quick. Tom, do you know offhand?

3 MR. HICKS: I don't know exactly. I think
4 Chapter 5 describes the instrumentation and what has
5 to be monitored. And again, it is one of the
6 situations where we just have to write the procedure
7 to implement what is described there.

8 MS. BORSH: Yes, the tech specs have the
9 limits.

10 MEMBER ABDEL-KHALIK: But what is that
11 limit?

12 MS. BORSH: What is the actual number?

13 MEMBER ABDEL-KHALIK: Yes.

14 MS. BORSH: Would you like us to look it
15 up for you? We can do that.

16 MEMBER ABDEL-KHALIK: Yes, please.

17 MS. BORSH: Would you do that, Tom? But
18 in addition to that, that is the limit but the
19 procedures are going to have a lower level of
20 detection so that we don't come close to the limit and
21 we make that clear.

22 MEMBER ABDEL-KHALIK: That is what I am
23 trying to find out.

24 MS. BORSH: Yes, but we haven't written
25 the procedures yet to define what the procedural limit

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1 will be. But it will be lower than what we are
2 telling you that is coming from tech specs.

3 MEMBER ABDEL-KHALIK: But how can you
4 describe a procedure without knowing that lower limit?

5 MS. BORSH: Because what we say in here,
6 we say the procedures are used to monitor leakage at
7 levels well below tech specs limits and provide
8 guidance for evaluating potential corrective action.
9 So we don't say what the limit is now. That is going
10 to be developed in accordance with Chapter 13 in
11 Section 13.5, which has this schedule for when the
12 procedures that have all of the details will be
13 developed.

14 CONSULTANT WALLIS: But they have to have
15 the ability to detect what the procedures say they
16 should be detecting. Is that what you are getting at?

17 I mean, it may not be possible to measure with the
18 accuracy that you are looking for.

19 MS. BORSH: Are you asking about accuracy
20 or are you asking about limits?

21 MEMBER ABDEL-KHALIK: Well, they are all
22 related. I mean, if the method by which you are going
23 to detect leaks is incapable of meeting the detection
24 limits, --

25 MS. BORSH: I see what you are saying.

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1 MEMBER ABDEL-KHALIK: -- I would like to
2 find out about it.

3 MS. BORSH: We are looking up the limits
4 right. But we don't have, you know, right now,
5 currently operating units have programs for detecting
6 leakage limits and I wouldn't expect that we wouldn't
7 be able to do as a minimum in five years what -- go
8 ahead.

9 MR. HICKS: Well, no pressure boundary
10 leakage and then five gallons per minute unidentified
11 leakage.

12 MEMBER ABDEL-KHALIK: Five gallons per
13 minute?

14 MR. HICKS: Five gallons per minute
15 unidentified leakage.

16 MR. WACHOWIAK: So, in the example for the
17 high-conductivity sump in the drywell, we just covered
18 this in a tier one meeting yesterday, the ITAAC says
19 that that instrument is supposed to be able to
20 discriminate a 1 gpm change over an hour. And it is
21 supposed to alarm at a 5 gpm change. So for that
22 particular instrument, this tech spec, the 5 gpm would
23 alarm. So that is set into the design.

24 But I think there are other areas in LDIS
25 where you would have different criteria for the

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1 different instruments. So in the steam tunnel, you
2 would detect leakage using a temperature sort of
3 measurement. And I would presume, because I haven't
4 looked at that part recently, but I would presume that
5 there are portions in the design just like in the high
6 connectivity waste where we would specify what can be
7 detected. And that is the list of the different
8 places that they exist.

9 MEMBER ABDEL-KHALIK: Okay, thank you.

10 MR. WACHOWIAK: But the high connectivity
11 waste which corresponds to that 5 gpm, we did just
12 look at it in tier one yesterday in the meeting.

13 MS. BORSH: All right.

14 MR. EUDY: We have a discussion. Our
15 technical staff has a slide on that. So, we might be
16 able to stand on that as well. It needs to be able to
17 discriminate at one and it alarms at five.

18 MR. HICKS: In the DCD text, it also says
19 that the sump instrumentation is designed with the
20 sensitivity to detect leakage step change of one
21 gallon per minute within one hour and then it alarms
22 if the flow rate exceeds the five gallon per minute
23 limit that we talked about. So it is both the total
24 flow rate and also a step change limit.

25 MEMBER ABDEL-KHALIK: Okay.

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1 MS. BORSH: GE may have all the answers.
2 Would you please change the slide? We are on two open
3 -- the last slide. There you go.

4 CHAIR CORRADINI: So you mentioned this
5 and I have a question here. If I remember the SER in
6 this location, you need to submit a pressure
7 temperature limiting report. Right? And if I
8 remember what was written, that was supposed to happen
9 in the second quarter of '09. Did it happen?

10 MS. BORSH: Yes, June 17th.

11 CHAIR CORRADINI: So, will the staff
12 comment on -- I am curious. Is this report supposed
13 to be universal so that it applies to all designs or
14 specific for North Anna?

15 MS. BORSH: It is for all the ESBWR
16 plants.

17 CHAIR CORRADINI: All ESBWR.

18 CONSULTANT WALLIS: So it is not a GE
19 responsibility?

20 MS. BORSH: GE prepared the document.
21 Well, I am not sure what you mean by responsibility.

22 CONSULTANT WALLIS: Well, I would think
23 that GE would set the pressure temperature limits for
24 ESBWR. All you have to do is to have procedures to
25 make sure that you follow those, what GE recommends.

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1 Isn't that all you have to do or do you somehow modify
2 the pressure temperature limit?

3 MR. HICKS: Well, the report defines the
4 methodology that one would go through to come up with
5 the curves. And GE did that. And then later, we are
6 going to have to take the actual vessel material
7 information from the actual vessel and run that
8 through the methodology and modify the curves to make
9 them plant-specific.

10 CONSULTANT WALLIS: Over the years.

11 MR. HICKS: Well, initially up front and
12 then as the fluences change, it will be modified.

13 MR. WACHOWIAK: Okay.

14 MS. BORSH: And that is what this slide
15 talks about. That we submitted the report June 17th
16 and it does use bounding material properties, as Tom
17 as saying.

18 MR. EUDY: One of our staff will be able
19 to discuss --

20 CHAIR CORRADINI: That's fine. I just
21 wanted to see the commitment was to have it come in in
22 the second quarter, so you guys have it and are
23 looking at it.

24 MR. EUDY: Yes.

25 CHAIR CORRADINI: Okay. Thanks.

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1 MS. BORSH: And the second open item is
2 what Tom and Graham were talking about, which is to
3 provide a commitment. We are supposed to provide a
4 commitment in our FSAR to respond to an RAI that we
5 will be updating the PTLR with plant-specific material
6 properties prior to fuel load.

7 And there are no confirmatory items.

8 CHAIR CORRADINI: Who is making the
9 vessel?

10 MS. BORSH: It is a group effort.

11 CONSULTANT WALLIS: It is making the
12 forgings and then it is being fabricated in Spain.

13 MS. BORSH: And then in Italy, they are
14 doing something after that. Right?

15 MR. ETHERTON: JFW is making the forging,
16 and ENSA in Spain is the vessel fabricator.

17 COURT REPORTER: Can we get the name?

18 MR. WACHOWIAK: You mean the person on the
19 phone?

20 COURT REPORTER: Yes.

21 MR. WACHOWIAK: Steve Etherton.

22 CHAIR CORRADINI: And that is in the works
23 now?

24 MR. ETHERTON: Yes.

25 MR. WACHOWIAK: It is being fabricated as

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1 we speak.

2 CHAIR CORRADINI: Thank you.

3 MEMBER ARMIJO: There is no reason to
4 believe that there is anything unusual about this
5 material or the fabrication of what would lead to a
6 Pressure Temperature Limit Report that is very
7 different from current vessels, I would expect.

8 MR. WACHOWIAK: Not different from current
9 forged vessels.

10 MEMBER ARMIJO: Yes, that is what I mean.

11 CONSULTANT WALLIS: Well, vessels haven't
12 been made for some time.

13 MEMBER ARMIJO: Not nuclear vessels. But
14 I mean, the material and the fabrication processes,
15 there is nothing really radically different. You will
16 be getting the properties, I imagine, as soon as the
17 things are welded up and whatever heat treatment you
18 do.

19 CONSULTANT WALLIS: That is assuming that
20 manufacturers know how to make these vessels now.

21 CHAIR CORRADINI: There is only one
22 manufacturer in the world. They keep on doing it for
23 a whole bunch of people. So I think they do. I hope
24 they do.

25 MR. WACHOWIAK: Maybe they are not a lot

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1 going on in the U.S. but there are other countries
2 that are making vessels.

3 MR. PIEPMEYER: So this is David Piepmeyer
4 with GEH. The vessel is being fabricated in the same
5 methodology as the ABWR, which we have done here very
6 recently.

7 MEMBER ARMIJO: Right. And same diameter.
8 It is pretty big.

9 MR. PIEPMEYER: Very close dimensioning.
10 The same materials. The same methodologies.

11 MR. WACHOWIAK: The same diameter. It is
12 taller.

13 MS. BORSH: Well and Steve, Jerry Deaver
14 is not -- is one of them there with you now? I know
15 that you have an audit going on.

16 MR. ETHERTON: Yes. Actually, while you
17 were talking I was trying to get some people. Yes, we
18 are trying to coordinate with an NRC meeting that is
19 going on right now here. Can we get a little bit of
20 time? Maybe I can get somebody maybe in five minutes.

21 MS. BORSH: Well and generally, we have
22 spoken with Jerry Deaver and Tao Wu, the person that
23 prepared the PTLR and they had the same expectations,
24 generally, about PTLR and where the critical points
25 would be. You know, talking about around the belt

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1 line for a BWR and what they found was what they
2 expected was consistent with other BWRs. There wasn't
3 anything unusual.

4 CHAIR CORRADINI: Okay, fine.

5 MS. BORSH: Okay, that was our overview of
6 Chapter 5 and now NRC will present their information.

7 MR. EUDY: Hi, I'm Mike Eudy, project
8 manager for North Anna and I am going to invite the
9 technical staff to come up.

10 We have Neil Ray with our CIB branch, who
11 is going to be handling the technical discussion.
12 Like I said, this is the staff's review and we thank
13 Dominion for their presentation. We believe that it
14 is an accurate representation of content of their
15 FSAR. And now we are going to go through a couple of
16 slides and we are going to discuss the staff's
17 technical evaluation of this section. And there is
18 quite a host of characters that were involved in the
19 review of this. We have consolidated and are ready to
20 discuss the technical issues.

21 CHAIR CORRADINI: He is going to represent
22 all of them.

23 CONSULTANT KRESS: When you have a whole
24 bunch of reviewers like this, do you pick out sections
25 of it to review for each one of them or do they all

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1 review everything or a mixture of those?

2 MR. RAY: Let me address that. First of
3 all, I am Neil Ray. I am the Acting Branch Chief for
4 Component Integrity Branch. And to answer your
5 questions, as I said, I am going to present the entire
6 Chapter 5. However, as you know, Chapter 5 involves a
7 huge chapter and it involves all different
8 disciplines. And as a matter of fact, the first
9 question, to answer your question is no. Every group
10 has their own responsibilities and their own experts
11 in their field.

12 Saying that, even this name does not
13 include all of the technical staff involved. Because
14 every time we get any special issues or so, we discuss
15 with other folks as well, even though they may not be
16 within the team, even when we go our way to go do our
17 work, NRC Research or NRC NRR, all those people, to
18 get their information to get their knowledge. Does
19 that answer your question?

20 CONSULTANT KRESS: Yes. Does one person
21 like for example, yourself, end up writing the whole -
22 -

23 MR. RAY: No.

24 CONSULTANT KRESS: -- SER?

25 MR. RAY: No. Every particular person

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1 within the small group, they write it and they cross-
2 review it before it goes to the Branch Chief. The
3 Branch Chief looks at it from his or her perspective
4 and then it goes to the projects. That is
5 specifically the process.

6 MR. EUDY: When we were designing the
7 reviews, we came up with an acceptance review to kind
8 of figure out who was going to take the leads on these
9 chapters. So that way, any supporting inputs would go
10 to a lead branch and then they would report to us. So
11 in the ends, we would, projects would consolidate all
12 of the inputs for each section to put it all into one
13 cohesive document.

14 CONSULTANT WALLIS: Do the chiefs do any
15 reviewing or do the chiefs just review what is written
16 by the experts?

17 MR. RAY: Well the answer is questionable,
18 as I say. That is that every group, for example --
19 let me give you an example.

20 In the reactor vessel area, there is a
21 small group of people. And when they reviewed it,
22 then it goes to another kind of lead reviewer and he
23 or she asks questions, answers, and then they write
24 the safety evaluation. It goes through a then lead
25 reviewer and then it goes to the Branch Chief for the

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1 chief --

2 CONSULTANT WALLIS: So the Chief can be
3 involved technically in the quality of the review as
4 well?

5 MR. RAY: Yes. Absolutely, yes, depending
6 on his or her expertise, of course.

7 CONSULTANT KRESS: Each one of these
8 reviewers have a copy of the Standard Review Plan for
9 this chapter --

10 MR. RAY: Yes.

11 CONSULTANT KRESS: -- and they all go by
12 it?

13 MR. RAY: Yes. I will go with much more
14 detail of the background.

15 MR. EUDY: And quite often, you will see
16 in the SCR they will reference a section of the SRP
17 that they need to look into this particular issue. So
18 you will see that quite often, but it depends on the
19 reviewer how to reference that information.

20 This is a generic slide. And here is all
21 the sections that were invented by Dominion and we are
22 going to pull out our topics of interest on these
23 certain sections and their titles that we are going to
24 discuss.

25 And now I will turn it over to Neil Ray to

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1 begin the technical discussion.

2 MR. RAY: Again, good morning. Let me
3 start by saying that I am going to present Chapter 5
4 but let's not forget Chapter 5 involves lots and lots
5 of people and their expertise, their hard work. So,
6 all credit really goes to them, not to me. So I want
7 to make sure of that.

8 Secondly, let me -- Tom Kevern started
9 saying that thing but let me make sure that all of you
10 folks, including us, understand the process. During
11 my presentation you will hear the word "IBR." You
12 will hear the standard verbiage. You will hear COLA
13 supplement. And let me take a minute or so to explain
14 that in detail. What are those?

15 First of all, "IBR" means incorporated by
16 reference. It does not mean that applicant says so
17 and we said oh, let's do it. Let's move on. We don't
18 do that. We cannot do that. It involves the DCD
19 review checking and whether it makes sense to us.
20 When I say it makes sense to us, meaning, as you know,
21 the nuclear industry is not a static industry. It is
22 continuously moving. We get always new problems. So
23 we have to be always on top of it.

24 And so even it if is IBR, if we find a new
25 knowledge, anything new happened in the industry, we

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1 tried to get answers from the applicants. And only at
2 that point we move on.

3 Next, COLA supplement.

4 MEMBER ABDEL-KHALIK: Excuse me.

5 MR. RAY: Yes?

6 MEMBER ABDEL-KHALIK: Do you have any
7 examples in which an items was incorporated by
8 reference in which you judged based on new information
9 --

10 MR. RAY: Yes.

11 MEMBER ABDEL-KHALIK: -- that reference is
12 no longer appropriate?

13 MR. RAY: Let me -- not exactly to that
14 point but let me give you a broad answer to your
15 question.

16 For example, ESBWR, when we started
17 reviewing the process, the ESBWR was Rev 4 and COLA
18 applicant was Rev 0. So sometimes Rev 0 may not
19 represent to Rev 4 or Rev 0 is saying that we are
20 incorporating by reference. Whereas, in ESBWR, we are
21 still reviewing that particular chapter. So that
22 question back and forth, we ask our request for
23 additional information goes back and forth between DCD
24 and COLA applicant.

25 At some point, when we are satisfied, then

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1 they would close that chapter.

2 MEMBER ABDEL-KHALIK: I guess my question
3 --

4 MR. RAY: The answer to your question, for
5 example, the question you asked, Sam, that prior to my
6 presentation is hydrogen water chemistry control
7 system. For example, when we review Chapter 4, we
8 asked North Anna that we know BWR has a problem of
9 IASCC, IGSCC. What you are going to do? So that is
10 an example that we know that what is going on in
11 current BWRs.

12 And they instantly agreed with us and they
13 volunteered to use hydrogen water control system.
14 That is not -- that is an optional system. They don't
15 have to do it.

16 MEMBER ABDEL-KHALIK: I am asking a
17 process question.

18 MR. RAY: Yes.

19 MEMBER ABDEL-KHALIK: Okay. The
20 applicant, as we have seen, incorporates many items by
21 reference.

22 MR. RAY: Yes.

23 MEMBER ABDEL-KHALIK: Are you saying that
24 the staff can actually go back and say no you cannot
25 incorporate this particular item by reference because

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1 we now have additional information that renders that
2 unacceptable? Is that part of the process?

3 MR. RAY: We look at that. For example,
4 in the Reactor Vessel Surveillance Capsule Program, we
5 know in the current reactors both BWRs and PWRs, the
6 Surveillance Capsule Program sometimes may not be
7 adequate because of so many reasons I don't want to
8 waste time on that.

9 And so, based on our information, we make
10 sure, for example, -- let me give you an example like
11 leak factor. They cannot have a leak factor one.
12 They have to have at least more than one. So we
13 wanted to make sure that you position your
14 surveillance capsule in such a way that it has to be
15 more than one.

16 So that is just a process. What I am
17 saying is we always want to be on top of it what is
18 going on in the industry and make sure that we
19 incorporate in our sub-team evaluation. That is
20 basically what I am trying to tell you.

21 CONSULTANT KRESS: What do you do about
22 something like GSI-191, which is steel beam?

23 MR. RAY: As a matter of fact, that is a
24 very good question and we do not have a complete
25 answer at this time. We are still working on it.

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1 CONSULTANT KRESS: Do you intend to wait
2 for it to work itself out?

3 MR. RAY: Absolutely. We are still
4 working with our research. We are working with NRR.
5 As a matter of fact, we had a big meeting yesterday
6 what to do about it and still that is an open issue.
7 We don't know how to close it, to be candid with you.

8 MEMBER ABDEL-KHALIK: I still do not have
9 a clear answer to my question.

10 MR. RAY: Yes.

11 MEMBER ABDEL-KHALIK: Okay. I am asking
12 if the applicant incorporates something by reference,
13 your response, your earlier response implied that you
14 examined that.

15 MR. RAY: Yes.

16 MEMBER ABDEL-KHALIK: And based on newly
17 found information --

18 MR. RAY: Yes.

19 MEMBER ABDEL-KHALIK: -- you may find that
20 to be inappropriate.

21 MR. RAY: Yes.

22 MEMBER ABDEL-KHALIK: And if that is the
23 case, what do you do? Do you go back and render that
24 part of the DCD to be unacceptable?

25 MR. RAY: You have to -- one thing we have

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1 to understand is, simply put, we walk in a regulatory
2 environment. We cannot force the applicant what we
3 like to do. For example, flow-accelerated corrosion.

4 It is not really a regulatory guidance but the
5 applicant always do it because they know the risk
6 involved in it.

7 And so for example in the ABWR case, when
8 we find because every ABWR license was 1996 or 1994.
9 And so they did not address flow-accelerated
10 corrosion. So we came to them. We said, hey look.
11 This is a serious issue. What are you going to do
12 about it?

13 CHAIR CORRADINI: Let me just break in. I
14 don't think you guys are on the same plane. Your
15 answer is something but I only guess what Professor
16 Abdel-Khalik is asking. I think all he is asking is
17 pretty simply is that you made reference to the fact
18 that if something is incorporated by reference, you
19 don't just casually accept it. You double check it.

20 MR. RAY: Yes. That is --

21 CHAIR CORRADINI: Okay.

22 MR. RAY: -- precisely what I am saying.

23 CHAIR CORRADINI: All right. And then his
24 question was, in your double checking, if something
25 needs to be added, do you require them to put all the

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1 stuff in or are you just required to put what is
2 necessary back in the DCD and leave the IVR? I think
3 that is his process question. Am I getting close?

4 MR. RAY: No, we do not go back to DCD.
5 If DCD is already closed, we do not go back to DCD.

6 MEMBER ARMIJO: But it isn't. So in this
7 case, you could go back and say there is a flaw in the
8 DCD as written, before it gets approved --

9 MR. RAY: You are absolutely right.

10 MEMBER ARMIJO: -- put it in an approved
11 DCD certified design.

12 MR. RAY: Absolutely right.

13 MEMBER ARMIJO: You would just have to
14 leave that alone --

15 CHAIR CORRADINI: Which we don't have at
16 all.

17 MR. RAY: Correct. It is a lot easier for
18 us really to go back to DCD and tell them to address
19 it, rather than to the COLA's space. That is the
20 difference here.

21 CHAIR CORRADINI: Yes, but just to nail
22 down the question so that we can move on.

23 MR. RAY: Yes.

24 CHAIR CORRADINI: Your answer, at least in
25 this case as I understand it, since both are active,

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1 if something is amiss, you will most likely tell the
2 applicant on the GEH side to upgrade the DCD and leave
3 the IBR in.

4 MR. RAY: Correct.

5 CHAIR CORRADINI: Okay.

6 MR. RAY: That is simply what we do, yes.

7 CONSULTANT KRESS: Yes, that would be a
8 lot better. There may be lots of other COLAs come
9 along. So we would rather have it in the DCD.

10 MR. EUDY: It is certainly a unique
11 situation that these are in parallel.

12 CONSULTANT KRESS: Yes.

13 MR. EUDY: But we have had instances where
14 we typically will, the technical reviewer may raise a
15 technical issue but we will issue an RAI. Dominion
16 will answer it and quite often, they will work with
17 GEH and us to try to figure out what is the best way
18 we should resolve it in DCD space. Or with them, we
19 have had several where it reverts over to DCD because
20 we have a lot of the same reviewers both from DCD and
21 reviewing Dominion. And typically we will issue the
22 RAI to them and get it fixed in whichever way it needs
23 to be.

24 CHAIR CORRADINI: Since we are in on
25 process, I have a question that I have been struggling

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1 with but maybe it is obvious. So it will be quick.

2 I am trying to understand sometimes what
3 constitutes a construction open item or a
4 construction, I will get the wording wrong, versus an
5 RAI back to the DCD. Do you understand what I am
6 getting at?

7 MS. BORSH: A construction open item?

8 CHAIR CORRADINI: A construction, a CO --
9 we are going to eventually get to there are certain
10 things that you are essentially holding open for the
11 COLA, rather than going back to the DCD. And I don't
12 understand the character of those. Are they mainly
13 procedures that you want to see fleshed out? Do you
14 see what my question is?

15 It is not in this chapter. We are going
16 to get to it later but since we are in the world of
17 process, I want to get that cleared. Is that what it
18 -- I see the character of it was mainly procedures
19 that you leave open until you see more fleshed out
20 details of them. Is that correct?

21 MR. EUDY: Right. We, quite often we
22 will. It depends on the comfort level of reviewer on
23 the specific issue.

24 CHAIR CORRADINI: Okay.

25 MR. EUDY: If they want to see how much

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1 detail up front. Basically the question we ask
2 ourselves, can we license this thing with the
3 information given or do you need more to get it
4 licensed. And where is it going to be after the
5 licensing phase? Where is it addressed? And do we
6 want feedback or is it something we can audit? Is it
7 covered in ITAAC or is it covered in the procedures?

8 Sometimes we also say, maybe this would be
9 a really good licensing condition. And we haven't
10 gotten to that phase yet but we are actively making
11 sure that we are going to get what we need for these
12 types of issues.

13 CHAIR CORRADINI: Okay, thank you.

14 MR. RAY: Okay, moving on. Sections
15 5.2.1.1 and 5.2.1.2, essentially, DCD agrees these
16 subjects and we want to make sure that all applicants
17 use ASME Section XI requirements, which is required 10
18 C.F.R. 50.55(a). And similar thing is required for OM
19 Code Editions/Addenda and that is also requirement of
20 50.55(a).

21 And in terms of 5.2-3, the applicant
22 confirm that they are going to use Code Cases which is
23 really acceptable to NRC as required by 1.192. So if
24 no open items, it is acceptable to us.

25 Regarding Section 5.2.4, pre-service and

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1 in-service inspection and testing of Class 1
2 components and piping, they basically said they will
3 provide a milestone schedule in sufficient detail for
4 the staff to evaluate. So, we will get enough time so
5 that they are following ASME Section XI criteria and
6 we will get enough time to evaluate that problem is
7 acceptable to us or not.

8 COL FSAR stated that, which is very
9 important to all of us because accessibility is a huge
10 issue in terms of the substance of NDE. And we wanted
11 to make sure that the applicant provides the access.
12 And that includes, obviously, the most important
13 parties, austenitic and dissimilar metal welds as
14 well.

15 So based on their response, staff is
16 satisfied and there are no open items for 5.2.4.

17 CONSULTANT WALLIS: I have got a question.

18 MR. RAY: Yes, sure.

19 MR. WACHOWIAK: I am not sure it is
20 appropriate here but you are talking about these
21 pressure boundaries and so on.

22 MR. RAY: Yes.

23 MR. WACHOWIAK: You have the vessel. Then
24 you have the containment.

25 MR. RAY: Right.

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1 MR. WACHOWIAK: But there are total
2 boundaries say between the dry well and the wet well.

3 Is that part of this story or is that something
4 different altogether? You know, there is leakage
5 between those elements, which are inside containment.

6 Is that part of this story or is that not? Does that
7 appear somewhere else? When do you monitor the
8 leakage rate between the dry well and the wet well?
9 Is that something that is part of this chapter or does
10 it appear somewhere else?

11 MR. RAY: Well, leakage, we are coming to
12 that, leakage in part 2.5. And Chang Li may address
13 that question. Chang Li, did you hear the question?
14 We will come back to you.

15 MR. WACHOWIAK: Yes, fine. I am not clear
16 when you talk about this pressure boundary --

17 MR. RAY: Right.

18 MR. WACHOWIAK: -- if it is the overall
19 boundary --

20 MR. RAY: Yes.

21 MR. WACHOWIAK: -- of things or if it is
22 the boundary between tings.

23 MR. RAY: We will come to that in part
24 2.5.

25 Okay. Leak Detection Monitoring. What

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1 happened here that, in terms of again with what you
2 are talking about, NA FSAR Rev 0 and DCD Rev 4, the
3 procedure are kind of different. So we asked them
4 questions to make sure that those two procedures are
5 identical. And they did it in NA FSAR Revision 1 and
6 that basically lead to detection monitoring now.

7 Dr. Graham, if you ask that question, Mr.
8 Li is there. He did review 5.2-2-H, so he may answer
9 this question about leak detection in the dry well
10 area you are talking about.

11 CONSULTANT WALLIS: Between the dry well
12 and the wet well. There are various kinds of leakage.

13 It is this undefined leakage which appears in certain
14 analyses which is presumably through cracks or
15 something. And then there is another leakage through
16 vacuum breakers which are not working right.

17 Is this part of this review or does that
18 appear somewhere else? Because that is part of
19 general leakage within containment.

20 CHAIR CORRADINI: I don't think they are
21 talking containment.

22 CONSULTANT WALLIS: We are not talking
23 about that now. Are we?

24 MR. RAY: We are not talking about
25 containment leakage.

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1 CHAIR CORRADINI: We are talking about the
2 high pressure boundary.

3 MR. RAY: Right.

4 CONSULTANT WALLIS: Well this is a
5 pressure boundary, though.

6 CHAIR CORRADINI: But it is not the high
7 pressure boundary for the reactor coolant system. I
8 think that is what --

9 CONSULTANT WALLIS: Well there is two.
10 There is -- I understand the causes. I saw the vessel
11 the piping but they are also talking about containment
12 as a pressure boundary, aren't you?

13 MR. RAY: No.

14 CONSULTANT WALLIS: No, not in this part.
15 Okay, so that I understand. You are only talking
16 about the piping system.

17 MR. RAY: That is correct.

18 CONSULTANT WALLIS: When do we talk about
19 these other questions?

20 MR. RAY: I don't know.

21 MR. HICKS: Containment is in Chapter 6.

22 MS. BORSH: It's in Chapter 6.

23 CONSULTANT WALLIS: And then when you talk
24 about containment, you are also going to talk about
25 these different parts of containment and the leakage

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1 between them. Are you going to talk about that?

2 CHAIR CORRADINI: We did. That was the
3 last meeting.

4 CONSULTANT WALLIS: That is all over.

5 MS. BORSH: But most of that is in the
6 DCD.

7 CONSULTANT WALLIS: That is all over. I
8 am just making sure that it is not part of this
9 discussion here.

10 CHAIR CORRADINI: But I think, if I
11 understand where your question is, I think a lot of
12 that still are open items that we are going to review
13 and we are going to be discussing relative to the DCD.

14 CONSULTANT WALLIS: We are going to see
15 that again.

16 CHAIR CORRADINI: Later this year.

17 CONSULTANT WALLIS: Okay.

18 MEMBER ABDEL-KHALIK: The implication was
19 made earlier by at least two of the presenters that
20 these reviews are not pro forma, that they are
21 detailed and thorough. So, to understand that, could
22 you explain to me what is involved in the first bullet
23 as far as your review is concerned?

24 MR. LI: Okay. This is Chang Li. I am
25 the reviewer for reactor coolant pressure boundary

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1 leakage detection.

2 Over here, we reviewed Revision 0 in NA
3 FSAR. They initially said it is an IBR. And we look
4 into it and compare their statement because they
5 changed somewhat from the DCD. And explained for
6 example, the first bullet that in the DCD, we are
7 asking them to provide the procedures to identify and
8 monitor the low level unidentified leakage. Low level
9 which corresponded to a level that is way below the
10 tech spec limit. The tech spec limit is five gallons
11 per minute within an hour for unidentified leakage.

12 So we are asking them to have early
13 warning signals like an alarm to alarm the operator.

14 MEMBER ABDEL-KHALIK: I am sorry. Let me
15 elaborate just to avoid the same kind of exchange we
16 had earlier.

17 We have a bullet here that says procedures
18 to identify and monitor the low level unidentified
19 leakage. So, what is involved in this review? Do you
20 actually have a procedure on hand and you check the
21 adequacy of that procedure to meet the limits
22 specified in tech specs?

23 MR. LI: No. We don't have the procedure
24 at this point. They committed to have a procedure.

25 MEMBER ABDEL-KHALIK: So by making this

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1 statement, this is nothing but a checkmark that they
2 have committed to make this procedure. It is not a
3 detailed review.

4 MR. LI: The content of the procedure.
5 The scope of the procedure and the schedule. When
6 they are going to make this procedure available. So
7 those are the elements that when we do the review to
8 make sure the COL applicant recognize they have this
9 responsibility. And when they develop the procedure,
10 they have to be consistent with what is aimed at the
11 DCD and that they have a committed schedule that they
12 will provide procedure and we don't review at this
13 point.

14 MEMBER ABDEL-KHALIK: When and how would
15 you review these procedures to determine their
16 adequacy?

17 MR. LI: This procedure will be provided
18 before the fuel load, according to Chapter 13
19 schedule. And at that point, the procedures may or
20 many not be directly submitted to NRC for review.
21 However, the NRC inspectors will be able to review it
22 on site when the procedures are --

23 MEMBER ABDEL-KHALIK: But this appears to
24 be an ITAAC. It is not?

25 MS. BORSH: Well is there an ITAAC for

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1 creating the procedure? Is that what you are asking
2 for professor?

3 MEMBER ABDEL-KHALIK: No, an ITAAC for the
4 procedure itself, not creating the procedure.

5 MS. BORSH: Yes, that is to say, develop a
6 procedure and the acceptance criteria would be that a
7 procedure exists. Correct? That kind of ITAAC, not
8 about the actual content. We don't have any procedure
9 -- there are no ITAAC, essentially, about programs or
10 procedures.

11 CONSULTANT WALLIS: It is rather strange.

12 MS. BORSH: It would come under the QA
13 program. It is for structured systems.

14 MEMBER ABDEL-KHALIK: I am struggling
15 here. Okay? The comments were made repeatedly that
16 this is not a pro forma review. This is a detailed
17 review. And I am trying to understand how detailed
18 and how thorough is this review. And the impression I
19 am getting is that this is nothing but just making
20 sure that this is a checklist.

21 MS. BORSH: Well, the acceptance criteria
22 are specified in the SRP and the SRP doesn't
23 necessarily take the NRC reviewer to reviewing the
24 actual procedures. There is some acknowledgment in
25 the SECY letters and in the Reg Guides and in the SRPs

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1 that for the new plants for COL applicants, not all of
2 the QA programs, the administrative controls will be
3 in place ten years prior to starting, to loading fuel.

4 And so there are allowances made by the
5 NRC that say okay, as long as you fully describe your
6 program, you have milestones, you have licensed
7 conditions, and there will be licensed conditions for
8 the programs and procedures and limitation that we
9 will have to address and close out. So, those
10 controls will be in place.

11 And then like the reviewers for the
12 programs and procedures, for the other things, the
13 level of design detail that is required by the SRP,
14 that is all in either the DCD or the COLA and the NRC
15 reviewers are reviewing that information. But the
16 procedures and programs are fully described, the
17 milestones are provided and there will be license
18 conditions that we have to address before it will all
19 be said and done and then there will be the inspection
20 program that will do reviews as we go along
21 construction and operations. And it will all be done
22 at that point.

23 MEMBER ABDEL-KHALIK: So it is the
24 responsibility of the region inspectors to check these
25 procedures?

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1 MS. BORSH: That is the expectation.

2 MEMBER ABDEL-KHALIK: That would have an
3 inspection report of some sort?

4 MS. BORSH: Right. It is not the design
5 reviewer that is necessarily looking at this license.

6 MR. KEVERN: This is Tom Kevern from the
7 staff. If I could clarify please. It sounds like we
8 are in the process discussion. Let me amplify what
9 Gina Borsh was saying that for reasonable assurance
10 finding, we go to that level of detail of the design
11 and for the COL additional level of completeness.

12 And what was being explained before was,
13 in this particular case, that that first bullet on the
14 content of the procedures, the content has to have a
15 certain level of detail in a procedure, for example,
16 the reference to the tech specs as well as an alarm
17 indication, as well as some means of identifying to
18 the operators lead time to take action before the tech
19 spec is violated.

20 Now, the procedures per se, are not
21 something that is provided as part of the COL
22 application. The procedures that was being identified
23 here are identified in Chapter 13, 13.4 table, where
24 we have got the extensive list of all of the
25 procedures that are committed to by the applicant.

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1 And that is part of the staff's construction
2 inspection program. A combination of both
3 headquarters' staff organization, as well as Region
4 II. And subsequent to a COL issuance, then X number
5 of days or months prior to fuel load, depending on the
6 various milestone, that is when the procedure, as well
7 as other additional documentation is provided, as well
8 as then removing the ITAAC, too.

9 But in this case, we are just talking
10 procedures and those are made available to the staff.

11 So whether the staff at the level of detail of
12 inspection of this particular procedure, for example,
13 is not yet determined. But that is made available and
14 we had the option of reviewing that to whatever extent
15 we think is appropriate at that point in time. And
16 that is all provided prior to fuel load to ensure that
17 the complete set of the procedures as committed to in
18 the FSAR are completed and reviewed as if considered
19 necessary or appropriate by the inspection folks, the
20 NRC staff prior to fuel load.

21 Is that a reasonable explanation?

22 CONSULTANT WALLIS: That seems to be a
23 promise to do something. I mean, that is something
24 that is very important but we don't yet know what it
25 is.

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1 MR. LI: I have one statement --

2 CONSULTANT WALLIS: Is that a fair
3 statement? Because we can't yet know what it is. It
4 is just like a promise I will provide a paper for some
5 meeting at some conference but I haven't written it
6 yet. That is sort of the level you are at.

7 MR. KEVERN: Well, I would just amplify in
8 response to that question that we do not have the
9 entire document but we have the key parameters of that
10 document.

11 MR. LI: We do review the key parameters
12 that is identified and is answered.

13 CONSULTANT WALLIS: You have a reasonable
14 assurance that the proper procedures will eventually
15 appear. That is as far as you can go at the moment.

16 MS. BORSH: Yes.

17 CONSULTANT WALLIS: But what is in those
18 procedures is very important when you get there.

19 CHAIR CORRADINI: But let me just -- I am
20 waiting for you guys to say it but I guess you are not
21 going to say it. BWRs have run before. So I am
22 assuming that this procedure is not going to be a heck
23 of a lot different, unless there is particular things
24 like vacuum breakers or isolation condensers or PCCS.
25 When we get to the things that are unique to the

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1 ESBWR, I might personally start getting interested.
2 But I assume a lot of these things are going to be
3 essentially taken from operating procedures that are
4 already well practiced.

5 MEMBER ABDEL-KHALIK: But my question did
6 not sort of come about because there is something
7 unique about this particular procedure. I am just
8 trying to understand how thorough are these reviews in
9 general.

10 So, thank you.

11 MR. RAY: Okay, let's move on.

12 MR. EUDY: Was the question answered?
13 Okay, we are all good.

14 CONSULTANT WALLIS: Oh, now page numbers
15 appear. That is good.

16 CHAIR CORRADINI: We were sensing you
17 ought to know where we were.

18 CONSULTANT WALLIS: There are some page
19 numbers and some of them don't have page numbers.

20 MR. EUDY: I am not a PowerPoint expert.
21 I must have messed that up.

22 MR. RAY: Okay, let's talk about reactor
23 vessel materials. Let me tell you up front that
24 reactor vessel materials didn't change much compared
25 to the current operating reactors, with the exception

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1 that it will have a less copper content and less
2 nickel, less sulfur, in the belt line area,
3 particularly to address radiation embrittlement.
4 Other than that, entire reactor vessel materials
5 essentially will be similar or same to the current
6 reactors.

7 Saying that now let's talk about Reactor
8 Vessel Materials and Surveillance Capsule Program. As
9 we know, this is a very important program and we had
10 some issues with the current reactors. So for the new
11 reactors, we wanted to make sure that Reactor Vessel
12 Materials and Surveillance Capsule Program should be
13 as best as possible in terms of monitoring the
14 radiation embrittlement of the vessel.

15 And saying that, we want to make sure that
16 whatever is necessary to this at this time we know the
17 vessel is not fabricated yet. So we have lots of
18 quite a few unknowns. So we want to make sure that
19 the program is made in such a way that there should
20 not be any surprise when actual vessel is fabricated
21 and actual surveillance capsule program developed.

22 And so we have several questions and to
23 our satisfaction, applicant provided all of the
24 appropriate information and we are quite satisfied
25 with the Surveillance Capsule Program as of now.

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1 In terms of Pressure-Temperature Limits,
2 let me, I heard the discussion before with Dominion
3 with you. What happens is in the Pressure-Temperature
4 Limit area, instead of Pressure-Temperature Limit,
5 they are providing PTLR, which is slightly different
6 than Pressure-Temperature Limit. Very briefly, the
7 idea here is Generic Letter 96-03, which allows the
8 applicant to pick out the pick out the Pressure-
9 Temperature limit from the tech spec and put it under
10 administrative control.

11 And to allow that, we have to go through
12 a little review process about seven criteria. And we
13 want to make sure they address all of this criteria.
14 And as Gina said, in June they submitted a PTLR. And
15 this PTLR is in current review by the staff. And when
16 it is approved, the plan is to use this PTLR for all
17 ESBWRs. However, we have to note here that this PTLR
18 provides the Pressure-Temperature Limits which we call
19 it a bonding Pressure-Temperature Limits for 60 years,
20 applicable to 60 years, with the very fundamental
21 assumption that there are two fundamental assumptions.

22 One is in terms of belt line material properties and
23 the second assumption is the fluence projection. And
24 with those two assumptions, they provided us, the P/T
25 Limits for applicable to 60 years. And we are, as I

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1 say, we are currently reviewing that P/T Limits.

2 Moving to 5.4-1, operating procedures
3 provide guidance to avoid water hammer events. And
4 that is all really we know here. And the supplement
5 they provided will be addressed in the plant operating
6 procedures. And if you have any further questions on
7 that, one of our experts will answer those questions
8 about procedure.

9 CONSULTANT WALLIS: Quite circular
10 reasoning, somehow. That's okay, I guess. Operating
11 procedures provide guidance and then supplement --
12 water hammer we have addressed in the procedures. I
13 mean, two statements are the same.

14 MR. RAY: Yes, it is. It is kind of same,
15 yes.

16 CONSULTANT WALLIS: Again, it is a promise
17 to do something.

18 CHAIR CORRADINI: So let me just ask my
19 question again on this one because this one could be
20 it looks like it would get our attention, this one.

21 What is unique about the ESBWR design that
22 these procedures would be different than current
23 operating BWRs?

24 MR. RAY: Anybody wants to address that?
25 I can give my answer but I talked to the people who

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1 reviewed it, they would be better to --

2 CHAIR CORRADINI: To put it crudely, why
3 not simply copy the procedures you have now for BWRs
4 and say it is applicable to ESBWR? What makes the
5 ESBWR unique that the operating procedure would be
6 substantially modified?

7 MR. WACHOWIAK: A couple of things that I
8 can think of that are unique. One, one of the systems
9 that we would be talking about is associated with RHR.
10 In ESBWR, that shutdown cooling function is provided
11 by reactor water cleanup. A completely different
12 system than is provided for in other BWRs, which would
13 be typically the LPCI or RHR system. So there is --

14 CHAIR CORRADINI: That would mean that
15 system would operate more under this design. Is that
16 your point?

17 MR. WACHOWIAK: The function for providing
18 the residual heat removal is done by a different
19 system that has different operating characteristics --

20 CHAIR CORRADINI: Okay.

21 MR. WACHOWIAK: -- than the existing
22 plants. That is one example.

23 The other systems that tend to be
24 susceptible to things like water hammer would be a
25 core spray system. We don't have a core spray system.

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1 A LPCI system. We don't have a safety-related LPCI
2 system. It is a non safety system that is normally
3 operating in fuel pool-cooling mode. So it has quite
4 different modes of operation. So while the principles
5 of avoiding water hammer, I think would be the same,
6 fill, vent, test but the details would be quite
7 different in an ESBWR.

8 CONSULTANT WALLIS: When you open the
9 valve to let the water from this gravity-driven stuff
10 come into the core, you don't want to have a big bang
11 in that plate, do you? That is something very
12 different.

13 MR. WACHOWIAK: Right. And I think in the
14 DCD discussion, we talked about that, whether or not
15 we closed your issue with that remains --

16 CONSULTANT WALLIS: Well the problem we
17 have sometimes is finding out what the piping really
18 is.

19 MR. WACHOWIAK: Right.

20 CONSULTANT WALLIS: We have different
21 drawings sometimes.

22 MR. WACHOWIAK: And so that issue for GDSC
23 was discussed in the DCD discussions. But once again,
24 there wouldn't be a procedure for the operation of
25 that system but there would be a procedure for the

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1 maintenance of that system to determine how you ensure
2 that it's filled after --

3 CONSULTANT WALLIS: Yes, to check that you
4 don't have bubbles or something.

5 MR. WACHOWIAK: Right.

6 MEMBER ABDEL-KHALIK: Now, let's go back
7 to the previous slide. And let's look at the last
8 bullet, the first sub-bullet. "Pressure-Temperature
9 Limits will not be exceeded during normal operating
10 condition and anticipated plant transients." This is
11 an assertion made by the applicant or a conclusion
12 arrived to by the staff?

13 MR. RAY: This was a requirement for Reg
14 Guide 1.206 for the applicants to confirm that
15 statement. And we are just, that is a supplemental
16 information. We just quoted that.

17 But in reality -- I know where you are
18 heading -- in reality it doesn't have any meaning
19 whatsoever. Nobody will ever cross the P/T Limits.
20 If they do, they have to analyze --

21 MEMBER ABDEL-KHALIK: I'm sorry, sir. I'm
22 sorry. I asked a specific question. I am trying to
23 understand what you put on these slides. And I asked
24 you whether this is an assertion made by the applicant
25 or a conclusion arrived to by the staff.

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1 MR. RAY: This is a statement made by the
2 applicant, which is required by Regulatory Guide
3 1.206. They just confirmed that they are not going to
4 cross the P/T Limits. That is all they are
5 confirming it.

6 And since, if you look at the style, the
7 Supplement 5.3-1, that is a requirement and they just
8 confirmed yes, we are not going to do it. That is all
9 it means. It doesn't mean anything beyond that.

10 CONSULTANT WALLIS: Okay, it is an intent.
11 It is not a prediction in reality.

12 MR. RAY: Correct.

13 MR. HICKS: What we say is that we will
14 have procedures. We have procedures that will follow,
15 you know, the tech specs which can define the
16 operating limits for the PTLR. So, that is kind of
17 what this statement says.

18 MEMBER ABDEL-KHALIK: Again, I am trying
19 to find out what is involved in these reviews.

20 MS. BORSH: Yes, you are trying to see if
21 the NRC staff reviewed, looked at information that
22 proved that we will not be exceeding the limits. What
23 did you look at to confirm that?

24 MEMBER ABDEL-KHALIK: What I am trying to
25 find out is what is involved in the staff review.

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1 MR. RAY: This last statement really does
2 not need any staff review whatsoever. It was stated
3 in Reg Guide 1.206. Applicant confirmed it and we
4 said okay, you confirmed it so we are happy. That is
5 the end of the story.

6 CONSULTANT WALLIS: How do they know this?
7 There must be some prediction of say a particular
8 operating trend here that shows that the pressure and
9 temperature goes through some sequence.

10 MR. RAY: Absolutely.

11 CONSULTANT WALLIS: And that must be done
12 by a computer of some sort?

13 MR. RAY: No. The whole thing, as you
14 know, the statement they can make is really based on
15 their operating procedure. That is by which the
16 control, the operator controls, so that it never
17 crosses the P/T Limits curve. That is the way they
18 will control it. It goes through the operating
19 procedure.

20 MEMBER ARMIJO: You would think you would
21 know, Graham.

22 CONSULTANT WALLIS: I don't understand why
23 this is so complicated.

24 CONSULTANT KRESS: If they are required to
25 stay below, when they start up and shut down, they are

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1 not transients and accidents.

2 MR. RAY: No. They are not accidents or
3 anything. They are required by law, by Appendix G --

4 CONSULTANT KRESS: And they have control
5 over that.

6 MR. RAY: The operator has the control to
7 keep it below that thing. In PWR, operator in
8 addition to P/T limits they provide them the system so
9 that they don't cause the P/T Limits.

10 MEMBER ABDEL-KHALIK: Let me ask you a
11 specific question. For North Anna, which anticipated
12 plant transient will produce the peak RCS pressure?

13 MR. RAY: It can bet he heat-up transient
14 or cool-down transient.

15 MEMBER ABDEL-KHALIK: Which transient will
16 produce the peak pressure? Does anybody on the staff
17 know?

18 MR. RAY: Peak pressure?

19 MEMBER ABDEL-KHALIK: Right.

20 MR. RAY: What do you mean by that?

21 MEMBER ABDEL-KHALIK: You say P/T Limits
22 will not be exceeded during normal operating
23 conditions and anticipated plant transients. Which
24 anticipated plant transient will produce the peak
25 pressure?

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1 MR. RAY: I cannot answer that question
2 because there is no such answer. If you look at
3 operating procedure, if you look at how do we develop
4 the P/T Limits, you will know how does it work. There
5 is no such thing because the cool-down and heat-up
6 both has, starting with 70 degree Fahrenheit to 550
7 degree Fahrenheit, it provides at different pressure.

8 And those pressure are the guiding principle so that
9 the reactor vessel doesn't fracture. That is the
10 guiding principle here.

11 MEMBER ABDEL-KHALIK: I have been trying
12 to ascertain --

13 MR. RAY: Yes, I know.

14 MEMBER ABDEL-KHALIK: -- the level of
15 detail that the staff goes through in making these
16 statements, in making these evaluations.

17 MR. RAY: This particular statement, staff
18 has nothing to do with it. Staff has only thing to do
19 with to review and approve P/T Limits. And once we
20 approve it, either it goes to the tech spec or if it
21 is PTLR, it gets out of tech spec and goes into
22 administrative control. And the North Anna in this
23 case, the operator must follow that P/T Limits all the
24 time, whether they are heating up or cooling down
25 transients.

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1 MEMBER ABDEL-KHALIK: That is fine. Thank
2 you.

3 MR. RAY: I think this statement is
4 disturbing to me also but it was done in Reg Guide
5 1.206 and they just agreed that yes, we are going to
6 follow it. That is all it is.

7 CHAIR CORRADINI: Go ahead. Oh, we are
8 done. Do we have additional questions? Hearing none,
9 are we off to Chapter 10? Back to the applicant.

10 MS. BORSH: All right, Chapter 10. Next
11 slide, please, Mike.

12 Chapter 10 covers the Steam and Power
13 Conversion System. In this Chapter, we added
14 information in the turbine generator section and in
15 the section on other features of steam and power
16 conversion.

17 In Section 10.2 on the turbine generator,
18 we added supplemental information in response to Reg
19 Guide 1.206, which asks us to provide the model number
20 for our turbine. And we are going to be using Model
21 N3R-6F52 from GE's N series nuclear steam turbines.

22 Then we addressed, we described the
23 turbine maintenance and inspection program. Most of
24 this is described in the DCD, except for the
25 inspection and maintenance frequencies. But the

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1 program that is described does support the equipment
2 manufacturers, turbine missile generation probability
3 analysis and we are going to establish the frequencies
4 for our inspection and maintenance based on the
5 bounding turbine missile probability analysis that GE
6 is --

7 CONSULTANT WALLIS: Can I ask you a
8 question? GE is very specific about the production of
9 steam in the reactor and so on. And you are specific
10 about the turbine generator. Is the DCD very specific
11 about the routing of the piping or does it, do you
12 have some discretion about how you route the piping
13 from the steam generating system to turbine?

14 MS. BORSH: That is all -- I think that is
15 all --

16 CONSULTANT WALLIS: That was in the DCD.
17 There is nothing, you have no discretion at all about
18 how you do that. Is that it?

19 MR. HICKS: That is in the scope of --

20 MS. BORSH: That is all -- go ahead.

21 MR. HICKS: -- GE.

22 CONSULTANT WALLIS: It is all specified.
23 That is nice to know.

24 MR. HICKS: Everything inside the turbine
25 building, pretty much, is.

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1 MR. WACHOWIAK: Now, let's try to explore
2 your question a little bit. There are attributes of
3 the steam system that are specified in the DCD. The
4 volume of the steam piping up to a certain point and
5 diameters and certain cross-over piping, things like
6 that.

7 CONSULTANT WALLIS: What it is close to
8 and that sort of thing, what it might affect is also -
9 -

10 MR. WACHOWIAK: And there is an assessment
11 of, I think, affects of pipe break there. But the
12 specific detailed routing, you know, is it going to be
13 here versus two inches over? That is not --

14 CONSULTANT WALLIS: Well, I am not
15 thinking about two inches over. I am thinking about a
16 major change. I mean, if it goes from here to there
17 and you can't go in a straight line because there are
18 things in between, does it go around this way or
19 around that way? That sort of thing can make a
20 difference. But they don't have that sort of
21 discretion or do they?

22 It used to be architect engineers could
23 put pipes all over the place and each plant was
24 different. And I think the ESBWR is not like that.

25 MR. WACHOWIAK: I believe that there is

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1 information in the DCD that would limit you from going
2 round about in the turbine building but the detailed
3 specific information is not there. There are things
4 like total volumes and other things that would tend to
5 imply a straight shot.

6 MR. HICKS: It is not in the DCD but it is
7 within the scope of GE when they designed the plant,
8 ultimately do file design.

9 MS. BORSH: It will be a standard design
10 that everyone will --

11 CONSULTANT WALLIS: It is a standard
12 design.

13 MR. HICKS: Yes.

14 CONSULTANT WALLIS: It will then be a
15 standard design.

16 MR. HICKS: Yes.

17 CONSULTANT WALLIS: Okay.

18 MR. WACHOWIAK: Yes, we don't want to
19 overstate what is actually in the DCD.

20 CONSULTANT WALLIS: One problem with
21 existing plants is, if you have a problem and you are
22 called in as a consultant or something, figuring out
23 where the pipes go. It can be very difficult. Even
24 finding the records that tell you where the pipes go
25 is a problem. But you are going to get away from that

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1 and have a really standard plant so you know where the
2 pipes go.

3 MR. WACHOWIAK: We will know where the
4 pipes go in the standard design, yes.

5 CHAIR CORRADINI: Up to a certain point.

6 MR. WACHOWIAK: Right. Because you have
7 to work around construction tolerances and there are
8 things that but minor things would be expected. Major
9 things, not anticipated.

10 CONSULTANT KRESS: If this turbine
11 generator has already been identified, I was wondering
12 if your last bullet on that slide hasn't already been
13 done?

14 MS. BORSH: Well, I am so glad you asked.

15 CHAIR CORRADINI: That is a perfect
16 question. I was going to ask the same thing. Go
17 ahead.

18 MS. BORSH: It is done.

19 CHAIR CORRADINI: It was an open item that
20 you had to submit in the second quarter. Right? Has
21 that been submitted then or am I remembering wrong?

22 MS. BORSH: It is supposed to be completed
23 in the second quarter.

24 CHAIR CORRADINI: Sorry. Excuse me.
25 Excuse me.

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1 MS. BORSH: And that is correct and GE
2 does plan to submit the document to the NRC for
3 information. Not for approval like the PTLR but for
4 information. And that should be happening. It may
5 even have happened yesterday.

6 Gary Anthony are you on the phone?

7 MR. ANTHONY: Yes, I am.

8 MS. BORSH: Hi, Gary. Gary is from GEH.
9 He is our subject matter expert. Do you happen to
10 know if the report was submitted yesterday or not?

11 MR. ANTHONY: We are still working on a
12 proprietary affidavit. I do expect it to be submitted
13 this week, though, both the public and the proprietary
14 version.

15 CONSULTANT KRESS: Well, this says it is a
16 probability analysis, which implies to me that you
17 have some frequency of failure in the turbine blades.

18 CHAIR CORRADINI: Of a certain size.

19 CONSULTANT KRESS: Of a certain size.

20 MR. ANTHONY: That is correct.

21 CONSULTANT KRESS: Is that data available,
22 do you actually have that?

23 MS. BORSH: Gary, do you want to answer
24 that question?

25 MR. ANTHONY: The report specifically

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1 outlined the design of the turbine which we are
2 proposing to use in the DCD for this N3R. And it is a
3 six-flow 52-inch blade machine specifically designed
4 for the ESBWR. And in the report, it discusses
5 statistically everything that we have learned over the
6 last about 30 years worth of turbine design and crack
7 growth propagations from back when the disks used to
8 be shrunk on the forgings.

9 At the present times, we are not using
10 disks any more. We use a solid forging such that we
11 have gotten rid of part of the, I guess Achilles heel
12 of the old turbines. So our numbers have turned out
13 quite well.

14 CHAIR CORRADINI: This was discussed in
15 one of the meetings for Chapter 10. I just wanted to
16 make sure I understood the commitment. The commitment
17 is to provide this report. That was the open item
18 that I understood from the SER.

19 MS. BORSH: Well it was to complete the
20 two pieces. And the other part is that we made a
21 commitment and the FSAR, Dr. Corradini, that says we
22 will actually be updating the FSAR to reflect the
23 inspection and maintenance frequencies based on the
24 completion of this report. So there is that piece of
25 it, too.

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1 CHAIR CORRADINI: So out of pure interest,
2 I have a funny feeling one of my colleagues on the
3 committee would love to review it. Are we going to
4 see it? Can we get a copy of it to look at when it
5 finally comes in?

6 CONSULTANT KRESS: Good question.

7 MS. BORSH: I don't -- can you answer
8 that, Tom?

9 CHAIR CORRADINI: If somebody out there
10 could answer that.

11 MR. KEVERN: This is Tom Kevern for the
12 staff. It is anticipated the staff is going to review
13 that. It was not specifically identified as a
14 document that staff is going to submit to ACRS. I
15 guess I could attempt to go out on a limb and say --

16 CONSULTANT KRESS: That would be a non-
17 event, almost.

18 CHAIR CORRADINI: Right. One of my
19 colleagues sent me an email saying he would love to
20 look at it.

21 CONSULTANT WALLIS: Well, I guess if the
22 ACRS asks for it, he usually gets it.

23 MR. HICKS: Make a note someone.

24 CHAIR CORRADINI: All right, thanks.

25 MS. BORSH: All right. So, that is that.

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1 Now we will move on to 10.4, other features of the
2 system. We added --

3 MEMBER ABDEL-KHALIK: Now, where is
4 feedwater temperature control? Is this is in this
5 Chapter?

6 MR. WACHOWIAK: Which aspects of the
7 feedwater temperature?

8 MEMBER ABDEL-KHALIK: Well, we don't have
9 forced CIRC water flow through the core. So you are
10 going to control power in the power flow map by
11 controlling feedwater temperature. And I am just
12 wondering where is that covered?

13 MR. WACHOWIAK: I guess my question is the
14 mechanics of controlling temperature would be in 10
15 but the affects of controlling temperature I believe
16 are in 15.

17 MS. WHITE: Yes, this is Frostie White
18 with GEH. That is in that NEDO 33-38 document that I
19 think you guys have seen. And that is a part of
20 Chapter --

21 CHAIR CORRADINI: We have had a
22 preliminary presentation on that.

23 MS. WHITE: Right. That is part of
24 Chapter 15. And I believe we are supposed to come
25 back and talk about that further.

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1 MEMBER ABDEL-KHALIK: But how about the
2 mechanics of feedwater temperature control by, I
3 assume control leads steam to the high pressure
4 heater.

5 MR. WACHOWIAK: So, Gary, Gary Anthony,
6 just to be sure, the mechanics of how you change the
7 feedwater temperature is described in 10. Right?

8 MR. ANTHONY: The physical arrangement of
9 the heater is drain lines and main steam and isolation
10 valves are in Chapter 10. The electronic controls are
11 over in Chapter 7 under instrumentation where the
12 discussion of how they leave steam in and effect
13 feedwater temperature.

14 And then Chapter 15 analyses the effects
15 of that feedwater temperature change.

16 MR. HICKS: That is all in the scope of
17 the DCD. We don't really talk about that in the COL.

18 CONSULTANT WALLIS: Now in Chapter 10 you
19 say the condenser in that maximum cold water
20 temperature is so much?

21 MR. HICKS: What was the question?

22 MS. BORSH: John, do you want to answer
23 it?

24 CONSULTANT WALLIS: In Chapter 10, there
25 is a statement about the condenser in that maximum

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1 cold water in that temperature.

2 MR. ANTHONY: That is correct. There is
3 tables in Chapter 10. That is our bounding numbers.

4 CONSULTANT WALLIS: Is it GE or North Anna
5 that is responsible for saying that 35 degrees C is
6 100 degrees Fahrenheit?

7 CHAIR CORRADINI: Are you looking for
8 somebody to blame?

9 CONSULTANT WALLIS: Yes. I want to know
10 who is responsible.

11 MS. BORSH: I will take responsibility for
12 it and we will get it fixed.

13 CONSULTANT WALLIS: Well what should it
14 be?

15 MS. BORSH: I'm sorry, Graham. Where are
16 you reading?

17 CONSULTANT WALLIS: Well, I just made a
18 note and I was reading about the circulating water
19 system. I got down to the condenser in that maximum
20 cold water temperature. I didn't have a page number
21 because the document didn't have pages on them when I
22 read them. But it is stated that the water
23 temperature is 35 degrees centigrade and 100 degrees
24 Fahrenheit. And 100 degrees Fahrenheit is what, 37.8
25 or something? So I just wonder which statement is

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1 true and it needs to be fixed. But it is not an
2 important issue.

3 MS. BORSH: Well, we will follow-up on
4 that. Thank you for point that out to us.

5 CONSULTANT WALLIS: Some of us read every
6 number and check it.

7 CHAIR CORRADINI: Are you open for other
8 reviews? The staff may need you. Sorry. I just had
9 to say that.

10 CONSULTANT WALLIS: Well maybe the staff
11 has changed the Fahrenheit scale or something. It is
12 possible. I wouldn't doubt it.

13 CHAIR CORRADINI: All right. Make a note.
14 Let's move on.

15 MS. BORSH: All right. We are good. All
16 right so now, moving right along.

17 CONSULTANT WALLIS: I think it is in
18 10.4.5 somewhere.

19 MS. BORSH: Yes, it looks like we have got
20 the correct number but we will follow-up on that and
21 get back.

22 CONSULTANT WALLIS: Maybe it is staff that
23 is responsible for this.

24 MS. BORSH: Maybe. But here we are and we
25 are going to talk about the DCD --

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1 MEMBER ABDEL-KHALIK: Just back to the
2 feedwater temperature control. I guess you are going
3 to come back to us with that?

4 CHAIR CORRADINI: We are supposed to have
5 a subcommittee on the DCD on that procedure in the
6 DCD.

7 MR. PIEPMEYER: David Piepmeyer, GEH.
8 Later this fall, we will be discussing several topics
9 over several meetings with you guys and one of those
10 topics is that.

11 MR. EUDY: Our SER identifies 37.8.

12 CONSULTANT WALLIS: I read 35. Maybe it
13 is an earlier edition of the SER that got sent to me.

14 MS. BORSH: Okay.

15 CONSULTANT WALLIS: It is not a matter of
16 management. It could have been fixed since you sent
17 me the document.

18 MS. BORSH: So in Section 10.4, we
19 describe the plant-specific portions of the
20 Circulating Water System, which is also referred to as
21 the CIRC.

22 The portions of the Circulating Water
23 System are within the scope of the DCD. Portions of
24 the system are identified as conceptual design
25 information in the DCD, which means that the COL

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1 applicant Dominion has to provide the plant-specific
2 information on those portions of the system. And that
3 is what we have done in 10.4. So the information that
4 we provided included the arrangement of the equipment,
5 descriptions of the components, how we are going to
6 operate the system and what kind of instrumentation we
7 are going to have.

8 We could talk about -- I don't know if you
9 guys have any questions on the particulars. We talk
10 about the heat sink; the pump and intake screen area;
11 pumps; pump discharge; interconnecting valves. You
12 know, this is some of the detail that the NRC reviewed
13 as part of their SER work.

14 Some of the things that we pointed out in
15 these slides is that we use the Chemical Storage and
16 Transfer System and blowdown control to control the
17 chemistry in the CIRC. We use station water to supply
18 makeup water to the system. Next slide, please.

19 CHAIR CORRADINI: I had a question about
20 this one.

21 MS. BORSH: Okay.

22 CHAIR CORRADINI: So, if I remember
23 correctly, in the DCD, they are natural draft and at
24 North Anna, they are hybrid cooling. Does that make a
25 difference somewhere in the analysis? I am looking at

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1 our PRA.

2 MR. WACHOWIAK: Not in the PRA analysis.

3 CHAIR CORRADINI: Why not? Wouldn't there
4 be some active components that would change the
5 failure probability to get the ultimate heat sink?

6 MR. WACHOWIAK: We didn't take credit for
7 that cooling tower at all in the PRA. We put the
8 boundary at the basin of the Plant Service Water
9 System.

10 CHAIR CORRADINI: So, for the long-term
11 cooling, you didn't care about the coolant. You just
12 watched the change in the temperature of the basin.

13 MR. WACHOWIAK: Yes. And we ensured that
14 there was enough volume in the basin to cover the
15 entire evaluation period of the PRA.

16 CONSULTANT WALLIS: That is 2.6 million
17 gallons.

18 CONSULTANT WALLIS: So that we wouldn't
19 have to take credit for these other non-standard
20 portions of the design.

21 MR. HICKS: I think Graham, what you are
22 talking about is service water basin.

23 CHAIR CORRADINI: Yes, I think we are
24 confusing that.

25 CONSULTANT WALLIS: Reserve water storage,

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1 isn't that what you are talking about or not?

2 MR. HICKS: Right now, we are talking
3 about the normal power.

4 CONSULTANT WALLIS: Anyway, that is the
5 72-hour cooling.

6 MR. HICKS: No.

7 CONSULTANT WALLIS: No?

8 MR. HICKS: Seventy-two hours of plant
9 service water in plant service water is a different
10 basin. There is two different basins.

11 CONSULTANT WALLIS: Two different basins.

12 MR. HICKS: We will talk about that when
13 we get to Chapter 9.

14 CONSULTANT WALLIS: Okay.

15 CHAIR CORRADINI: Okay, thank you. I
16 appreciate it.

17 MS. BORSH: In the SER, we have also
18 summarized the evaluation that we have performed of
19 any piping or component failure in the CIRC system.
20 And our evaluation concluded that the failure of a
21 pipe or component in the cooling tower or elsewhere in
22 the yard would not have an adverse impact on the
23 intended design functions of any safety related
24 structure systems or components.

25 And then finally, we provided a table in

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1 Section 10.4 that summarizes the recommended threshold
2 values of key chemistry parameters. And it includes
3 associated operator actions to respond to any leakage
4 that we have at the CIRC into the condenser.

5 There are two open items that are
6 associated with Chapter 10. We talked a little bit
7 about these. One is that we have to update the FSAR
8 to reflect the bounding turbine missile probability
9 analysis and the other is that we have got to
10 incorporate turbine maintenance and inspection
11 frequencies, based on turbine missile probability
12 analysis. Those are two separate items that are being
13 tracked but they are both related to the analysis.

14 And there are no confirmatory items.

15 With that, if there are no more questions,
16 we can turn it over to the NRC.

17 MR. EUDY: Okay, I will ask for the
18 technical staff to come up, George Georgiev and
19 Devender Reddy.

20 Okay, we thank Dominion for their
21 presentation on Chapter 10. We will now go into the
22 NRC staff review of this information. Here is the
23 technical staff. And essentially, here is the items
24 we are going to focus on for technical topics of
25 interest.

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1 And we agree that it was an accurate
2 representation of the content of North Anna's FSAR.
3 And I know I will turn it over to our technical staff,
4 Devender Reddy in the technical discussion.

5 MR. REDDY: We have already have touched
6 on the turbine generator. And basically, we have a
7 couple of or to additional items. Inservice
8 maintenance and inspection of turbine rotors and
9 missile probability analysis. And one of the COL
10 items aboard the turbine generator, the standard COL
11 Item number 10.2-1-A, that is a maintenance item by
12 Mr. George Georgiev.

13 MR. GEORGIEV: My name is George Georgiev
14 and I was the reviewer of the COL item. Basically, I
15 would like to echo the applicant presentation. We do
16 have a turbine model identified, which the
17 subcommittee remembered this in their presentation,
18 has been inservice with many hours. And this
19 particular model we didn't have any bounding analysis
20 so we can get an idea what are the materials
21 properties what are the fracture toughness, the fire
22 properties which I needed to calculate probability of
23 missile generation from a low pressure turbine rotor.

24 And those two items, COL items, cannot be
25 addressed during the design stage or until the turbine

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1 is actually built. When the turbine is built, there
2 will be actual materials properties, there will be
3 actual examination result, there will be actual
4 calculation of crack growth. And as a result of that,
5 you will end up with recommendation how often to open
6 the turbine casing to examine the rotor so that, you
7 know, this failure doesn't occur. And that is
8 pertaining to the maintenance inspection in turbine
9 rotor problem.

10 So, therefore, it is a legit open item.
11 We really don't expect much from the applicant at this
12 stage. We will get it before fuel load when the
13 turbine is actually built.

14 We are going to get some idea about the
15 turbine missile probability analysis when the
16 applicant docket their bounding analysis report.
17 Because what is going to happen, General Electric is
18 going to look at their database, they will look at
19 some materials property, some fracture toughness
20 result. They will assemble that. They will analyze
21 the various mode of failure, turbine bursts, stress
22 corrosion cracking, fatigue, whatever, and they will
23 come up with some bounding value what is the worst
24 could happen with this type of turbine materials. And
25 that has not been submitted. I haven't seen it yet.

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1 The staff hasn't seen it. When we will see it, if we
2 have comments, we will get back to the applicant.

3 So therefore, in conclusion, we do have
4 whatever we can get at this point. And something
5 later on this will be done and shall be done. And
6 this concludes my presentation. Any questions?

7 MR. REDDY: Well, if you don't have any
8 questions on the COL action items, I would like to
9 speak about the Circulating Water System. In the
10 staff, we call it CWS for short or CIRC. And with
11 respect to that Circulating Water System, in the
12 ESBWR portions of the ESBWR DCD, portions of the
13 Circulating Water System is identified as a
14 conceptual design information. In short, CDI. And
15 also they have one site-specific information item
16 with regard to that water quality that is becoming
17 literal part of that. And we have been discussing
18 about two items here about the Circulating Water
19 System. And we have got CDI. The other one is the
20 COL action with regard to the water quality.

21 As I said earlier, you know, only those
22 portions of the CDI items, the conceptual design
23 information items, that is the only aspect of the
24 application we recommended to the staff and one sort
25 of COL item. Regarding the CDI, the conceptual

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1 design information, the applicant provided the plant-
2 specific design and actual operation, instrumentation
3 and controls, flooding, and chemical injection.

4 Our staff evaluation. I heard earlier,
5 you wanting to know what does the staff do. How in-
6 depth that evaluation is. Our evaluation is based on
7 Commission Regulations and SRP guidance. And as far
8 as the Circulating Water System is concerned, we
9 evaluated based on GDC 4, general design criteria 4,
10 and also SRP guidance which is stipulated the details
11 of the GDC 4.

12 To confirm the GDC 4 requirements, the
13 SRP describes the system design, that is the CWS,
14 should include provisions to accommodate the effects
15 of discharged water as a result of failure of the
16 circulating water system or its components. And in
17 the process when applicant submitted, we reviewed it
18 based on this regulation, and we found that there was
19 information missing with regard to this flooding
20 aspect. Our focus has been flooding aspect.

21 And in an RAI at this point are the
22 details we need, the information for the respondent
23 and they shared a couple of things. One is when
24 there is a failure of the Circulating Cooling tower
25 or a pipe rupture in the area of the Circulating

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1 Water System, the site grading is such that the water
2 flows away from the plant, North Anna. And also, the
3 applicant provided further information that the
4 system has the provisions of the design features such
5 as air release valves -- vents so that it will
6 minimize the impact of -- transients.

7 So we looked at all that site-specific
8 design and operation and instrumentation controls.
9 So we decided that as far as Revision 1 of the
10 application is concerned, the applicant provided
11 adequate information and then we concluded that the
12 system controls for the operations and we found no
13 open items.

14 And that concludes. And also there are
15 no confirmatory items because the applicant revised
16 the Circulating Water System in Revision 1 and
17 provided the responses, part of the responses and
18 responded to RAIs.

19 I think next we would like to -- you
20 know, I talked about the CDI, the site-specific
21 information, but now we would like to talk about the
22 water quality and chemical injection.

23 MR. SASTRE: My name is Eduardo Sastre.
24 I reviewed the last COL item for Circulating Water
25 System. In this COL item, the applicant had to

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1 provide the threshold values and operator actions for
2 the chemistry excursions in the condensate for the
3 leakage from the CIRC water to the condensate system.

4 The applicant, as they stated in their
5 presentation, they provided Table 10.4, wherein they
6 stated all their control parameters and operator
7 actions they are going to follow. And we reviewed
8 this table with Reg Guides 1.56 and actually the
9 control parameters and the operator actions in Table
10 4 are more stringent than Reg Guide 1.56. And for
11 that reason, the staff find it acceptable.

12 I think that is the end of the
13 presentation.

14 MR. REDDY: So if you have any further
15 questions on Chapter 10 sections.

16 CHAIR CORRADINI: Questions by the
17 Committee? All right. Why don't we take a break and
18 then we will come back with Chapter --

19 MS. BORSH: Eleven.

20 CHAIR CORRADINI: -- Eleven. I am trying
21 to say we are going on.

22 We will get back together at 10:30.

23 (Whereupon, the foregoing meeting went off the record
24 at 10:13 a.m. and resumed at 10:32 a.m.)

25 CHAIR CORRADINI: Okay, let's go back

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1 into session and start with Chapter 11, please. GEH
2 will kick it off.

3 MS. BORSH: Well, GEH/Dominion. One big
4 happy family.

5 CHAIR CORRADINI: Sorry.

6 MS. BORSH: That's all right. Rick, are
7 you ready to present? No, I'm just kidding.

8 CHAIR CORRADINI: If that is true, I am a
9 happy camper.

10 MS. BORSH: I know.

11 Okay, so let's talk about Chapter 11.
12 Are you going to do the slides for me? Okay. Okay,
13 thank you.

14 All right. Chapter 11 is Radioactive
15 Waste Management. And we added information to all of
16 the sections of the DCD except for source terms.
17 Next slide, please.

18 In Section 11.2, which discusses liquid
19 waste management, we included a cost-benefit analysis
20 for the system and the analysis that we performed was
21 done to satisfy the requirements of 10 C.F.R. 50
22 Appendix I for those system augments that are
23 compatible with the BWR design.

24 Okay, so what we did was we took the cost
25 parameters from Reg Guide 1.110 Appendix A without

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1 exception. And you all probably know this but 110 is
2 the cost-benefit analysis for radwaste systems for
3 nuclear power plants. None of the augments that we
4 evaluated that are provided in the Reg Guide were
5 found to be cost beneficial to reducing the annual
6 population doses. And so we did not make any design
7 changes.

8 To address one of the COL items that is
9 in the DCD, we described the design and the
10 procedures that address the non-radioactive systems
11 that could become contaminated. This is a special
12 design requirements for connections and sampling of
13 non-radioactive systems to verify that they haven't
14 become contaminated.

15 Then in the 11.2, we also reference the
16 design and procedures that we use to address
17 minimization of contamination.

18 In 11.3, we covered gaseous waste
19 management. And here we did a cost-benefit analysis
20 for the gaseous waste system, just like we did for
21 the liquid waste system to verify that we are meeting
22 the requirements of 10 C.F.R. 50 Appendix I for the
23 augments that are compatible with the BWR design.
24 And we found here that -- oh. And we also used the
25 same cost parameters that are in Reg Guide 1.110

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1 Appendix A without exception. And we found here also
2 that there were no design changes necessary that the
3 augments were cost beneficial.

4 CONSULTANT WALLIS: When you do these, I
5 mean, in one of these examples here, I'm trying to
6 figure out which one it is, you had an annual cost --
7 this was, I forget which one it was -- annual cost of
8 \$7,960. And it would have been effective if the cost
9 had been \$7,700. It seems awfully close. I just
10 wonder how good these estimates can ever be anyway.
11 You have three significant figures and you are making
12 a decision like that.

13 Can you really estimate that closely the
14 annual close? When it is really close to the
15 criterion, do you not go back and check it again or
16 something?

17 We will defer to Ken Jha, who is our
18 subject matter expert from Bechtel.

19 CHAIR CORRADINI: You are going to have
20 to come to the mike and identify yourself and speak
21 with sufficient clarity and volume.

22 (Laughter.)

23 MR. JHA: Ken Jha from Bechtel. Which
24 one were you referring to?

25 CONSULTANT WALLIS: Well, this is Section

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1 11.3-4.

2 MR. JHA: You said it was 7(E)?

3 CONSULTANT WALLIS: The gaseous waste
4 management system?

5 MR. JHA: Yes, what was the cost you were
6 including?

7 CONSULTANT WALLIS: There was an
8 estimated annual cost of \$7,960. And the reduction
9 would have been, the maximum reduction you could have
10 got I guess was 7.7 per person-rem, which would have
11 been \$7,700, which is awfully close to balancing.
12 Right? And just about, just a little bit too
13 expensive to be worthwhile.

14 I just wonder how accurately that you can
15 do this and why if it is so close you may not go back
16 and sharpen your pencil and say well maybe we should
17 do it anyway or something.

18 MR. JHA: Yes, well, I guess it is the
19 guidance is it is \$1,000 per person-rem. And I guess
20 it is not like if it is -- that guidance is not that
21 exact to begin with.

22 CONSULTANT WALLIS: But that is rough.
23 That is part of my point. I mean, it is a thousand.
24 It is not 995 or something. And if it had been
25 \$1,050 or something, in this case, you would have had

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1 to do it. So you might have said it is close enough.

2 Why are you doing it so close like that.

3 CONSULTANT KRESS: I thought the guidance
4 had been changed to \$2,000 per person-rem.

5 MR. JHA: Not if you are using Reg Guide
6 1.110.

7 CONSULTANT KRESS: I see.

8 CHAIR CORRADINI: Which is what? What is
9 the guidance for that?

10 MEMBER ARMIJO: One thousand.

11 CHAIR CORRADINI: One thousand.

12 MEMBER ARMIJO: That is what I thought.

13 MR. JHA: Yes, and that is based on 1975
14 dollars.

15 CONSULTANT WALLIS: You know, just when
16 it is so close, though, I am not sure you can
17 estimate. You say it is just rough. A thousand is
18 rough. I mean, it could have been 1,500 or
19 something. It is rough.

20 MR. JHA: Yes.

21 CONSULTANT WALLIS: So when you get
22 something which is so close to the criterion, I am
23 not sure do you want to say we are okay.

24 MR. JHA: Okay, now which -- how close
25 are we?

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1 CONSULTANT WALLIS: Well, you estimated a
2 cost of \$7,960.

3 MR. JHA: Okay.

4 CONSULTANT WALLIS: And if it had been
5 \$7,700, you would have had to do it.

6 CHAIR CORRADINI: I don't think the "had
7 to" is the correct part of that. I think that is --

8 CONSULTANT WALLIS: And it seems to me
9 that is awfully close and I am not sure that you can
10 make that sort of estimate that accurately.

11 MR. JHA: Yes well, the other thing you
12 have to keep in mind is that when we come up with
13 these benefits, we are assuming that these augments
14 completely remove a certain dose, which they do not
15 really.

16 CONSULTANT WALLIS: You are using an
17 extreme.

18 MR. JHA: Right.

19 CONSULTANT WALLIS: So maybe when it is
20 close like that you should go back and re-look and
21 say well, in reality we could only have reduced it by
22 25 percent and therefore it is a clearer case or
23 something. It just seemed to me it wasn't a very
24 clear case was being made.

25 MR. JHA: Okay. I guess we were using

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1 the \$1,000 per person-rem as a threshold. And I see
2 your point that yes, if you are close, you might want
3 to add further words in there to justify why you
4 didn't consider it.

5 CONSULTANT WALLIS: It just seemed to me
6 that when you came up with the annual cost of \$7,960,
7 that there with some slight change of the way you
8 estimated something it could easily have been \$7,660,
9 in which case you would have said do it.

10 CHAIR CORRADINI: But I mean, maybe I am
11 misunderstanding the conversation but, the limit is
12 \$2,000. So a factor --

13 MS. BORSH: It is \$1,000.

14 CONSULTANT WALLIS: In this case they are
15 very close.

16 CHAIR CORRADINI: Oh, okay. Excuse me.

17 CONSULTANT WALLIS: In this case they are
18 very close. Most of them were clear but this one was
19 so close, I just thought there might be a case for
20 going back and making the case a little bit clearer.

21 MR. HICKS: This was actually a threshold
22 thing. And then if you actually exceeded it, then
23 you go do additional analysis.

24 CONSULTANT WALLIS: That is right.

25 MR. HICKS: So this is kind of like a cut

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1 off.

2 MR. JHA: We looked at it in two ways.
3 This is \$1,000 compared to how much each augment
4 costs per year. And the other way we looked at it is
5 if it is below a threshold value then we would
6 consider it. If it is above that, we wouldn't.

7 CONSULTANT WALLIS: Yes but look, when
8 you estimate \$7,960, what is the accuracy with which
9 you can estimate that? I mean, if you could say that
10 you know, isn't that a 50th percentile sort of thing
11 or something. There is probably a 40 percent chance
12 that it is below the threshold. So maybe you should
13 do something. That is all I am saying.

14 MR. JHA: These estimates are all based
15 on the guidance that is provided. What is in Reg
16 Guide 1.110. The costs are in there with the cost
17 numbers. So we didn't --

18 CONSULTANT WALLIS: Oh, they tell you how
19 to estimate the costs?

20 MR. JHA: Yes.

21 CONSULTANT WALLIS: That is really
22 strange because the costs must vary from day to day.

23 MR. JHA: Well that is why it is all
24 based on 1975 dollars. The cost and the benefit are
25 both based on 1975 dollars. So that if you adjust

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1 one, you adjust the other.

2 CONSULTANT WALLIS: Well, okay. Maybe I
3 shouldn't belabor this point then.

4 CHAIR CORRADINI: I think they are
5 prescribed to do a certain --

6 CONSULTANT WALLIS: I understand that. I
7 understand that.

8 MEMBER ARMIJO: Well, is there anything
9 about the ESBWR design that it produces less liquid
10 waste or less gaseous waste that it gives it a
11 fundamental advantage so that these augments aren't
12 really much bad. That is what I would hope would be
13 the best reasoning is that the ESBWR is a cleaner
14 machine but I don't know if that is true or not.

15 MS. BORSH: Frostie, can you answer that?

16 MS. WHITE: This is Frostie White, GEH.
17 I mean, the radwaste systems in what we handle is
18 typical of what you have on boilers. I mean, there
19 is not a significant difference in the waste. I
20 mean, you have some features that reduce doses and
21 things like that and certainly make processes
22 simpler. And we certainly have taken into account a
23 lot of human factors into this and so that we don't
24 have contamination issues and spread it and things
25 like that. But I think in general this is --

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1 MEMBER ARMIJO: Fundamentally the same.

2 MS. WHITE: -- fundamentally like
3 everything else.

4 MEMBER ARMIJO: Okay.

5 MS. BORSH: Ken, did you want to add
6 anything to that at this point?

7 MR. JHA: No.

8 MS. BORSH: Okay. All right. So, we can
9 go on to 11.4? Okay.

10 So 11.4 is solid waste management. And
11 here we included a discussion about the cost-benefit
12 analysis but basically what we did here is that the
13 cost-benefit analysis that we performed for the
14 liquid radwaste system and the gaseous waste systems
15 include the doses that are generated from the solid
16 waste system. And so the analyses that we performed
17 for the gaseous and the liquid systems did not result
18 in any augments and therefore, we didn't need any
19 augments for the solid waste system. So that was our
20 conclusion there.

21 In Revision 1 of the FSAR, we state that
22 we do not use any temporary storage facility for
23 solid waste. The next items is where we reference
24 design features and procedures that address 10 C.F.R.
25 20.1406, which is about minimizing contamination.

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1 And we reference procedures --

2 CONSULTANT WALLIS: Wait a minute. You
3 use no temporary storage facility for solid waste?

4 MS. BORSH: Correct.

5 CONSULTANT WALLIS: Well then the instant
6 it is created it disappears?

7 MS. BORSH: We have temporary storage --
8 we are storing in the radwaste building that is part
9 of the standard plant design. We don't have --

10 CONSULTANT WALLIS: No additional. Okay.

11 MS. BORSH: Right. Thank you.

12 We are on the fourth COL item. We
13 specified the testing and the programs that we are
14 using to comply with Reg Guides 1.143 and 8.8. That
15 is about, those are about ALARA. And then we also
16 referenced design features and procedures that we
17 used for addressing IE Bulletin 80-10, which is about
18 contamination, potential contamination of non-
19 radioactive systems.

20 And then finally we provided a
21 description of the process control program. And here
22 for our program description, we used the NEI template
23 07-10, which is the generic template for developing
24 the Process Control Program. And that was approved
25 by the NRC. They issued the SCR in January of this

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1 year.

2 The next slide is 11.5, which is the
3 Process Radiation Monitoring System. And here, to
4 address three COL items, we provided references to
5 the Offsite Dose Calculation Manual, the ODCM and
6 Table 11.5-9 in the DCD. And these documents talk
7 about the derivation of each monitor's lower limit of
8 detection and sensitivity. The program for process
9 and effluent monitoring and sampling and the
10 sensitivities, sampling frequencies, and basis for
11 each gaseous and liquid sample that we are required
12 to take.

13 We also provided a description of the
14 Offsite Dose Calculation Manual. And the way we did
15 this was by using another NEI template, which is 07-
16 09, a generic template for the ODCM. And the NRC
17 also issued the SCR on this template in January.

18 And then finally, we provided a reference
19 to Chapter 12 for the specific analyses that we did
20 for doses to the public because that is where it is
21 contained in the DCD for the ESBWR.

22 CONSULTANT KRESS: Is there any place now
23 available to ship this radioactive waste, this low-
24 level waste? Didn't they close the place down in
25 Savannah River?

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1 MS. BORSH: Yes.

2 CONSULTANT KRESS: There is no other
3 place to send it now? You have to keep it in this --

4 MS. BORSH: At this time. But what we
5 are hoping is that in the next few years, the issue
6 will be resolved and there will be a place where we
7 can store the waste. That is our expectation.

8 CONSULTANT WALLIS: What is the
9 probability of success of your hope?

10 MS. BORSH: I haven't done those numbers.
11 But we are in revision -- we submitted a revision to
12 the FSAR in May, I believe, June or May, where we
13 provided a revision that does address longer term
14 storage of Class B and C waste. So we will have at
15 least ten years --

16 CONSULTANT KRESS: How long can you store
17 that stuff before you have to get rid of it or you
18 fill up?

19 MS. BORSH: At least ten years.

20 CONSULTANT KRESS: Ten years?

21 MS. BORSH: For our revision. And that
22 is under NRC review now. It is not in Rev 1 in the
23 document that you all saw and it is not in the SCR.
24 Actually there is an open item and that is the last
25 slide that we have.

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1 CONSULTANT WALLIS: Can you presumably
2 transport it, too?

3 MS. BORSH: I beg your pardon?

4 CONSULTANT WALLIS: Transport it?

5 CONSULTANT KRESS: Yes, it has to be.

6 CONSULTANT WALLIS: So you could, as a
7 last resort, you just transport it and drive it
8 around until someone finds a place for it.

9 (Laughter.)

10 CHAIR CORRADINI: This is not the MX
11 missile.

12 (Laughter.)

13 CONSULTANT WALLIS: It is a solution.

14 MS. BORSH: I hadn't thought about that.

15 CONSULTANT WALLIS: If you want to really
16 affect things, you drive it around the Beltway until
17 the government figures out what to do with it.

18 MS. BORSH: Up and down Pennsylvania
19 Avenue. Okay.

20 CHAIR CORRADINI: I had a question, just
21 a general question because I guess one of the folks
22 from GEH asked it. But from the standpoint of the
23 potential operator of the plant, is in terms of what
24 you have done at North Anna now with solid and liquid
25 and gaseous waste, do you see any major differences

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1 in how you would handle this design, this machine and
2 what it generates, versus what you do now at North
3 Anna?

4 MS. BORSH: That is a good question.

5 MR. HICKS: Well North Anna is a PWR so -

6 -

7 CHAIR CORRADINI: I know that. That is
8 why I am asking.

9 MR. HICKS: -- that is probably
10 different.

11 CHAIR CORRADINI: Right. So, you guys
12 are only skilled in BWRs so I am kind of curious on -

13 -

14 MR. HICKS: Well, Dominion operates BWRs
15 as well.

16 CHAIR CORRADINI: But all teasing aside.
17 What I guess I am asking is, I mean, the one thing
18 that I would expect you guys would evaluate is now
19 the plant is sitting there. It is operating. It is
20 generating so much gaseous liquid and solid waste.
21 Is there something characteristically different about
22 how this plant operates and what it would generate in
23 difference to your operation of the two current units
24 that you are considering, are considering,
25 evaluating, studying or is so much the same that

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1 there is no problem?

2 CONSULTANT KRESS: I have an addition to
3 that question.

4 CHAIR CORRADINI: So you are not going to
5 let her answer that one?

6 CONSULTANT KRESS: I am going to let them
7 answer at the same time.

8 CHAIR CORRADINI: Okay.

9 CONSULTANT KRESS: Generally, these
10 limits on what you can put out in a gaseous into the
11 air and so forth are plant-specific. When you have
12 got three plants, do you divide those by three or
13 four plants you divide them by four, or each plant
14 can be allowed to put out the same amount that is in
15 the guidance?

16 MS. BORSH: We have an evaluation that we
17 will get to in Chapter 12 that shows the total dose
18 that --

19 CONSULTANT KRESS: The total of all them?

20 MS. BORSH: Of all three units.

21 CONSULTANT KRESS: So it is a site
22 parameter instead of a plant parameter?

23 MS. BORSH: There are certain
24 requirements in the regulations. Yes, and you will
25 see that, where it is all three units and our ISFSI,

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1 our Independent Storage Facility for Spent Fuel.

2 CHAIR CORRADINI: Which is for -- which
3 will be for all three units. That is the thing that
4 you drive by as you are going to the plant. Right?

5 MS. BORSH: That is the thing you drive by
6 as you are going to the plant. I think that right
7 now, Marvin correct me if I am wrong, but I think
8 right now, that was built, designed for Units 1 and
9 2. I don't know if we would have to get some license
10 changes or make design changes in order to store Unit
11 3. Do you know, Marvin? This is Marvin Smith from
12 Dominion.

13 MR. SMITH: Marvin Smith with Dominion.
14 We really haven't addressed whether we would use the
15 same facility for Unit 3 at this point or not for dry
16 storage.

17 CHAIR CORRADINI: Okay. And then just
18 since you are up and just it is not really the first
19 question, but how many cycles can you store within
20 the ESBWR design before you would need an ISFSI or
21 whatever it is called?

22 MR. SMITH: We are looking to have 20
23 years' worth of storage in the --

24 CHAIR CORRADINI: Internal?

25 MR. SMITH: Internal.

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1 CHAIR CORRADINI: Okay, thank you.

2 MS. BORSH: Marvin, did you want to
3 answer Mike's question about doing the comparison of
4 the PWR radwaste versus the ESBWR?

5 MR. SMITH: Well again, there is some
6 similarities but you are going to have a completely
7 different operating staff and procedures. I mean,
8 they are co-located on the same site but there would
9 be, you would not really be having a single operating
10 group doing radwaste for Unit 3 and Units 1 and 2.

11 CHAIR CORRADINI: Okay, right. But in
12 some sense, there would be a coordination. And so --

13 MR. SMITH: There would be a coordination
14 for sure. But it would not be like you would have
15 the same staff doing both.

16 CHAIR CORRADINI: Thank you.

17 MS. BORSH: So on this last slide, we
18 just have the one open item. We are tracking or the
19 NRC is tracking the long-term management and storage
20 of the radioactive waste, as we talked about earlier.

21 And we have addressed it in the COLA revision, which
22 is under review. Rev 2 of the FSAR.

23 And there are four confirmatory items in
24 the SCR for Chapter 11. And that is it for Chapter
25 11 for our presentation. And now, Jean-Claude and

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1 NRC.

2 CHAIR CORRADINI: Staff, will you take us
3 through your evaluation?

4 MS. BERRIOS: Okay, I am Ilka Berrios, I
5 am here for Chapter 11. I have here with me Jean-
6 Claude Dehmel, who is the lead reviewer for Chapter
7 11. Here in this slide, you can see the people that
8 have been working with Chapter 11 to write this NCR
9 with open items.

10 Before we start the technical
11 presentation, I want to add that this is a unique
12 chapter because the section that is causing the
13 effluent releases and doses, it is in Chapter 12 and
14 this is based on the old SRP. According to the new
15 SRP, it is supposed to be Chapter 11. But when we
16 got these, it was still the old SRP so that is why
17 all the effluent releases and doses are going to be
18 discussed in Chapter 12. We are going to discuss
19 that after lunch.

20 CHAIR CORRADINI: Okay, fine.

21 MS. BERRIOS: So right now what we have
22 is a description of the systems.

23 CHAIR CORRADINI: Okay.

24 MS. BERRIOS: I am now going to give it
25 to Jean-Claude for the technical presentation.

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1 MR. DEHMEL: Thank you. Yes, just to
2 follow through on this, the DCD application for the
3 ESBWR was structured on the format of the SRP that
4 was issued before the revision of March 2007. And in
5 that version of the SRP, the description of the
6 performance of the liquid and gaseous waste
7 management system were addressed in Chapter 11.2 and
8 11.3 respectively, and the dosing was supposed to be
9 addressed in Chapter 12.

10 With the March 2007 version, we
11 essentially brought forward into each respective
12 section only description of the system, performance
13 characteristics, effluent releases, as well as the
14 associated doses.

15 So the ESBWR application, meaning all the
16 COLAs, are going to be a hybrid because of that,
17 unless we decide to impose a change. But all the
18 other plants will follow the new format of the march
19 2007 SRP.

20 So the Chapter 11 incorporates usually by
21 reference many elements of the ESBWR DCD and also
22 provides some supplemental information that are plant
23 and site specific.

24 So there are the five sections to Chapter
25 11, one involving the source term and the remaining

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1 four addressing the performance and design features
2 of the liquid waste management system, the gaseous
3 waste management system, the solid waste management
4 system, and the radiation monitoring system
5 associated with the monitoring outgoing releases for
6 the static and the discharge as well as addressing
7 some sampling programs.

8 One point of clarification about the
9 source terms, the way it is described in Chapter 11.1
10 and how we are going to be talking about it in
11 Chapter 12 is different. The source term in Chapter
12 11.1 addresses the primary cooling concentration and
13 primary steam concentration in this case, microcuries
14 per gram. The source term, as will be expressed this
15 afternoon to address offsite doses to members of the
16 public is expressed in curies per year. So there is
17 that kind of difference.

18 So the information that is presented in
19 Chapter 11.1, meaning by reference adopting
20 information that is in the DCD, only addresses itself
21 to source terms that are continued within the plant,
22 not those that are being released outside. So, we
23 will be talking about the effluent releases in
24 Chapter 12 this afternoon, how we looked at it and
25 what are the consequences, meaning the doses to the

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1 members of the public in stack releases and liquid
2 discharges.

3 CHAIR CORRADINI: But just to complete
4 your clarification, but there is a one-to-one
5 correspondence.

6 MR. DEHMEL: That is correct.

7 CHAIR CORRADINI: Okay. It is just the
8 way it is expressed.

9 MR. DEHMEL: Correct. Next slide. So
10 there are numerous COL information items we have
11 grouped in five categories. Those addressed, the
12 cost-benefit analysis requirements of Part 50,
13 Appendix I; contamination control and those
14 associated with the avoidance of unmonitored,
15 uncontrolled releases; low-level waste management
16 under the Process Control Program as an operational
17 document; low-level waste storage, short-term and
18 long-term; and the monitoring control of effluent
19 releases under another operational program called the
20 Offsite Dose Calculation Manual.

21 The implementation of the Process Control
22 Program in ODCM are treated as license conditions in
23 Chapter 13.4. So, here we are only interested in the
24 technical elements of the content of the PCP and the
25 ODCM, while the implementation with respect to

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1 license conditions and when they should be phased
2 into the licensing process is addressed in 13.4.

3 CONSULTANT KRESS: Let me ask you a
4 question about the source term.

5 MR. DEHMEL: The source term?

6 CONSULTANT KRESS: Yes. I presume that
7 there is a model for leakage from failed fuel. And
8 the question I have is -- I am not questioning the
9 model. I am questioning how. Do you use a tech spec
10 value for allowed amount of fuel to be failed to end
11 up with your source term? I imagine you get krypton
12 and stuff that goes up some sort of, gets released up
13 the stack somewhere from those models.

14 MR. DEHMEL: Yes. Basically, there are
15 three basic sets of documents that address it and
16 some of it reflects kind of tech spec like
17 conditions, as well as operating experience and the
18 assumptions for the purpose of calculating such
19 effluent releases.

20 For example, one of which is the ANSI
21 Standard 18.1, which actually, you know, walks you
22 through the process, allows you to make specific
23 adjustments for the kind of fuel, meaning the kind of
24 plant you have, and the performance of a different
25 type of system. For example, whether or not in this

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1 case you have a full demineralizer system.

2 It also relies on GE operational
3 experience of the 1971 GE source term, which is
4 referenced in Chapter 11.1 of the DCD, plus another
5 document from GE that addresses the operating
6 experience with liquid and gaseous effluent releases
7 from BWR plants. And NUREG-0016 in this case, the
8 BWR GALE code, for the purpose of assessing the
9 implications of releases for different plant
10 conditions for both liquid and gaseous effluent. And
11 that is described in some detail in Chapter 11.1 of
12 the ESBWR DCD.

13 CONSULTANT KRESS: Thank you.

14 MR. DEHMEL: Next slide, please. The
15 regulations and the review guidance shouldn't be
16 strange to you. Basically, it is already addressed
17 in the DCD and it is simply a subset of the
18 regulatory basis that is described in the DCD.

19 What is new here are the two NEI
20 templates which were not in the earlier version of
21 the SER for the ESBWR that were presented to you. So
22 what is new is the Offsite Dose Calculation Manual
23 NEI 07-09A and also the Process Control Program, both
24 as operational document under NEI 07-10A.

25 And basically, these two documents serve

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1 as kind of an interim licensing milestone until the
2 plan prepares, or the applicant I should say prepares
3 the site-specific Offside Dose Calculation Manual and
4 the site-specific Process Control Program.

5 So these are generic documents that have
6 been reviewed by the staff. There are two SCR issued
7 against these two documents. The item numbers are
8 cited in the SER, what you can actually look at, what
9 the ODCM and the PCP templates contain and the
10 staff's evaluation and endorsement of both of these
11 documents as interim milestone satisfactory
12 compliance of what is contained in Reg Guide 1.206 as
13 well as in the SRP Section 11.4 and 11.5. Next
14 slide, please.

15 So the next two slides, three slides, are
16 going to address the technical topics of interest;
17 meaning, what the staff looked at in reviewing the
18 application and some of the work that we did
19 confirming and/or generating requests for additional
20 information to the applicant resolving some issues.
21 So, if you had a chance to review the SER, there are
22 a number of items already discussing the SER. Some
23 of the things that we looked at and we questioned and
24 we obtained responses and we issued supplemental RAIs
25 and we found the responses were adequate the first

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1 time around.

2 So for 11.1, in this case, the source
3 term is fairly straight forward, we are going to be
4 talking about this this afternoon after lunch but
5 basically just kind of a quick sneak preview. We are
6 dealing with assumptions that were made, we stepped
7 back in time, assumptions that were made in the Early
8 Site Permit under the concept of Plant Parameter
9 Envelopes where Dominion had selected seven different
10 types of reactor technologies from those that
11 narrowed down to four for the purpose of developing
12 the source term and omitting the remaining three as
13 not being essentially adequate or appropriate for the
14 purpose of developing the Plant Parameter Envelope.

15 So the source term that is identified in
16 ESBWR obviously is null and void because of the
17 adoption of the source term in Chapter 11 and 12 of
18 the ESBWR DCD.

19 CHAIR CORRADINI: So just so I understand
20 what you just said, null and void meaning that these
21 essentially superseded and bounded?

22 MR. DEHMEL: Correct.

23 CHAIR CORRADINI: Is that --

24 MR. DEHMEL: It supersedes because now it
25 is specific to the ESBWR design. The primary

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1 assumption in the Early Site Permit reflected the
2 fact that they -- the decision was made by Dominion
3 to develop a perhaps overly conservative or bounding
4 series of source term -- so they looked at four
5 technologies, the ABWR with the thermal power
6 increase of 3900 megawatts and 4300 megawatts. They
7 look at an AP-1000 with the standard megawatt as it
8 is described in a DCD for the AP-1000. They look at
9 ACR-700 as another option. And finally, they look at
10 the ESBWR with a factor increase of 25 percent
11 because at that time the ESBWR source term was still
12 evolving with GE.

13 So by looking at those plants, they came
14 up with a source term for liquid and gaseous
15 effluence. But that is just an artifact of selecting
16 these four reactor design concepts and looking at
17 radionuclides and trying to maximize the radionuclide
18 source term for tritium, for copper, for tin, for
19 whatever radionuclide they have identified in the
20 Early Site Permit.

21 So by adopting the ESBWR formally, in
22 essence what Dominion has done is superseded,
23 eliminated all of the other technology that were
24 described in the ESP and focused specifically on the
25 source term that is currently in Rev 5 and Rev 6.

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1 CHAIR CORRADINI: So what I said is
2 actually not right. It is reversed, which is the ESP
3 had a bounding set of source terms. This is specific
4 and small.

5 MR. DEHMEL: Yes.

6 CHAIR CORRADINI: Okay, thank you.

7 MR. DEHMEL: So moving on to Chapter 11.2
8 in the Liquid Waste Management System, we focused on
9 the cost-benefit analysis because obviously there was
10 new information that was provided. We also looked at
11 the system descriptions and features that implement
12 information both in 80-10 and some of the elements
13 for filling the requirements of Part 10.1406. And
14 obviously, incorporation of the COL action items
15 identified in DCD Chapter 11.2.

16 So going back to the cost-benefit
17 analysis, what we did is duplicated or confirmed the
18 results provided by the applicants. We generated our
19 own spreadsheets that I have here for liquid and
20 gaseous effluence here, the worksheets. And
21 basically it is a cookbook type of calculations. The
22 prescription is well detailed in Reg Item 1.110. And
23 yes, you can go to three our four places, you know,
24 it implies a sense of accuracy which is obviously not
25 there but all of this information is based on 1975

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1 data.

2 So the \$1,000 per person-rem is embodied
3 in 10 C.F.R. 50 Appendix I while policy guidance to
4 the staff is \$2,000 per person-rem. But the
5 applicants are using a \$1,000 per person-rem because
6 it is codified. The \$2,000 per person-rem is not
7 codified. And we went through this with OGC. The
8 decision was made that -- well obviously, we made a
9 decision that yes, it is okay for the applicant to
10 use a \$1,000 per person-rem, even though there is a
11 \$2,000 number out there publishing in two documents
12 but those are not codified.

13 CONSULTANT KRESS: Is there an assumption
14 that the cost of the elements of the system you might
15 be thinking about putting in not going to be any
16 different? The dose, the benefits that you save is
17 going to be the same but the cost of these parts that
18 you are going to part together may have changed since
19 '75.

20 MR. DEHMEL: Well, most certainly.

21 CONSULTANT KRESS: So apparently, you
22 might get a different value for the cost-benefit,
23 even though you are assuming everything in 1975, some
24 parts of that might change up until now, where other
25 parts of it might not.

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1 MR. DEHMEL: Yes, I expected that kind of
2 question.

3 CONSULTANT KRESS: Oh, okay.

4 CHAIR CORRADINI: And your answer is?

5 MR. DEHMEL: And basically, well the
6 answer is it makes no difference.

7 CHAIR CORRADINI: Okay.

8 MR. DEHMEL: And the reason is because
9 obviously all of the information in the Reg Guide, if
10 you look at the Reg Guide, all these numbers are 1975
11 data. And that is actually also operation
12 constraints or not constraints, the operational
13 concepts, we show them a little more current. For
14 example, the life-span we will call it of some
15 equipment is soon to be 30 years. That was the
16 though when equipment was permanently installed in a
17 system. Now you have different types of operational
18 concepts where you have skid-mounted systems, where
19 at best, the operational life of that kind of system
20 is ten years.

21 So that makes a difference. The other
22 thing is I looked at the CPIs and PPIs from 1975 to
23 1995 because that is where the \$2,000 came from in
24 1995 in NUREG-1530. And I looked at Perry's Chemical
25 Engineering Handbook on how you can actually escalate

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1 the cost of an item that was produced back in 1995 to
2 currently, as well as escalate the cost of equipment
3 if you were to go from 20 gallons per minute to 40
4 gallons per minute.

5 Well, if you plug all of that data in and
6 you crank these assumptions with more assumptions,
7 you still come up with numbers that where three or
8 four places of accuracy or implied accuracy. But in
9 the end because you raised the \$1,000 per person-rem
10 to \$2,000 and you inflated all the other costs, the
11 conclusions remain the same.

12 In other words, it is not cost-beneficial
13 to augment the system for those kind of releases.
14 The releases are very low. We found this to be true
15 for liquid effluent and we found this to be true for
16 the gaseous effluent.

17 CHAIR CORRADINI: Is that an exercise you
18 did personally or is that something written down
19 somewhere?

20 MR. DEHMEL: No, I did that personally
21 because we are, the staff expect to be challenged in
22 some aspect that way. Because we have the licensing
23 tools that have before us and even though -- and we
24 have the SRP that tells the staff what to do. Okay?

25 So we march through the process. So in

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1 all of the guidance that is given before us, the Reg
2 Guide, and the review procedures described in the
3 SCR. But the idea is to have in our back pocket, so
4 to speak, that kind of knowledge, and say well what
5 if. So, we have it.

6 CONSULTANT KRESS: Do you use some sort
7 of average inflation rate since '75?

8 CHAIR CORRADINI: I think he used, he
9 said he used the CPI in the Chemical Engineering
10 Manuals.

11 MR. DEHMEL: Yes. Yes, the PPI increase
12 factor is 2.4.

13 CONSULTANT KRESS: Okay.

14 MR. DEHMEL: Yes, so that is what it was.

15 CONSULTANT WALLIS: Well, when I go to my
16 garage to have my car fixed, I can insist on 1975
17 prices for parts or labor?

18 (Laughter.)

19 CONSULTANT WALLIS: It sounds pretty
20 good.

21 CONSULTANT KRESS: Well you can try that.

22 CONSULTANT WALLIS: But you say it
23 doesn't make any difference.

24 MR. DEHMEL: No. All the numbers came up
25 but you still, you know, if you compare now to the

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1 \$2,000 per person-rem, the decision is still, the
2 conclusion I should say is still that it is not cost-
3 beneficial to augment the system.

4 CONSULTANT WALLIS: That is fine.

5 MEMBER ABDEL-KHALIK: But prescribing the
6 costs in the guidance, does that sort of stifle
7 innovation?

8 MR. DEHMEL: Well, the idea is to come up
9 with a, remember because here the idea is an ALARA
10 concept. We are trying to normalize and make all the
11 plans, essentially, live up to a common standard or
12 reach a common standard. So the idea is to present a
13 basic set of system description, associated labor
14 costs, repair costs -- maintenance costs, I should
15 say, and escalation clauses that are built into the
16 Reg Guide, such that everybody can use the same
17 cookbook, the same methodology. There is nothing
18 preventing the applicant from using other
19 assumptions. But everybody is using the Reg Guide
20 because you adopt the Reg Guide, as far as the review
21 process for the staff, it expedites everything.

22 MEMBER ABDEL-KHALIK: But that is sort of
23 based on specific technology. And the question is,
24 does that sort of stifle innovation? People just say
25 well, I am just going to follow what is prescribed

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1 here.

2 CONSULTANT WALLIS: I am very surprised
3 because if there is an advance in technology which
4 makes things cheaper, then it worthwhile to install
5 these things.

6 MEMBER ABDEL-KHALIK: Right.

7 MR. DEHMEL: Well, but that is the case,
8 because if you look in the EPR application, there are
9 waste treatment processes in the EPR that are not
10 described in the Reg Guide. Similarly, if you look
11 at the ESBWR design, as far as the all gas system,
12 one of the system augment in there is a charcoal
13 delay bed with 30 tons of charcoal. Well, if you
14 look at the design of the ESBWR, there is 230 tons of
15 charcoal.

16 So GE has looked at what was done in the
17 past, looked at releases, and said well, you know, 30
18 tons of charcoal is really not adequate in this day
19 and age and they actually increased it to 230 tons.

20 So there are some decisions that are made
21 by the applicant or by the NSSS vendors to augment,
22 increase, you know, improve the design, so to speak.

23 As an aside, as a separate effort, we are
24 in the process of, well, we will be starting shortly
25 to revise all of these Reg Guides. NRR right now is

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1 in the process of revising the \$1,000 per person-rem.

2 There is a contract in place. There will be a new
3 number. It will be higher than \$1,000 obviously.

4 CHAIR CORRADINI: They are also not '75
5 values either.

6 MR. DEHMEL: No, no. This is going to be
7 2008, 2009. Absolutely. And then in revising the
8 Reg Guide, we are going to look at the list of
9 technologies that are identified for BWR/PWR,
10 integrate everything; labor costs, maintenance costs,
11 purchase cost of the equipment, everything will be
12 looked at. All of the assumptions are going to be
13 changed.

14 CONSULTANT WALLIS: That is very
15 interesting. It assumes all people are equal, too.

16 CHAIR CORRADINI: Isn't that the
17 Constitution?

18 MR. DEHMEL: All right. So, 11.3.
19 Everybody is ready for 11.3?

20 CHAIR CORRADINI: Let's try to do that,
21 yes.

22 MR. DEHMEL: All right. So, for 11.3 it
23 is the same thing. We looked at the information
24 provided in the application and here is essentially a
25 four-point analysis on the spreadsheets regarding the

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1 cost-benefit analysis for the augmentation of the
2 system. And there, only we looked at whether or not
3 it would be logical and would we benefit adding
4 another 30 tons of charcoal to a charcoal delay bed
5 system that already had 230 tons.

6 So similarly, you can plainly seeing the
7 outline of similar methodology applied the PPI, CPI,
8 and you apply the scaling factors for the cost and
9 larger equipment, the conclusion is the same.

10 In Chapter 11.4, Solid Waste Management
11 System, here there were no cost-benefit analysis
12 required because all of the incidental generational
13 liquid and gaseous waste is captured by the Gaseous
14 Waste Management System as well as the Liquid Waste
15 Management System. So, there is no need to do a
16 cost-benefit analysis for the Solid Waste Management
17 System.

18 The applicant identified options --

19 CONSULTANT WALLIS: Solid waste stays as
20 solid waste as it is stored? It doesn't decay into
21 gases or anything like that?

22 MR. DEHMEL: No, there are gases that are
23 produced --

24 CONSULTANT WALLIS: From the solid waste.

25 MR. DEHMEL: -- from the handling and the

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1 processing of the solid waste but that is captured by
2 the old gas system. Similarly, the incidental
3 production of liquid waste while one is processing
4 the solid waste, that has been captured by the Liquid
5 Waste --

6 CONSULTANT WALLIS: But when you store
7 it, there is off-gas from the storage, too,
8 presumably.

9 CHAIR CORRADINI: What he is asking is,
10 as a solid waste ages, does it off-gas radioactive --

11 CONSULTANT WALLIS: It releases gases.

12 CHAIR CORRADINI: That is what I think he
13 is asking.

14 MS. BORSH: I'm not seeing that. Go
15 ahead, Jean-Claude.

16 MR. DEHMEL: If it is dry active waste,
17 compactable trash and so on, that is going into the
18 55 gallon drums, other type of boxes and sealed.

19 CONSULTANT WALLIS: Oh, it has all been
20 sealed.

21 MR. DEHMEL: It has been sealed.

22 CONSULTANT WALLIS: Okay.

23 MR. DEHMEL: For other types of waste
24 such as for example some resins that may be stored in
25 high-integrity container, there would be small amount

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1 of gases that will be generated in off-gas, yes. If
2 the container is held at the site for a long time,
3 then it has to be connected to the exhaust
4 ventilation system, that is correct.

5 So again, the applicant has adopted the
6 NEI generic PCP template 07-10A until a site-specific
7 PCP is prepared on a license condition. We talked
8 about this. And the applicant is not using any
9 temporary low-level waste storage facility.

10 So, we have an RAI open on this one with
11 respect to what happens in the long-term because the
12 design of a radwaste building provides storage for
13 about six months of capacity. And the expectation
14 based on information provided in the DCD is that any
15 leaking plant will generate about 15,000 to 16,000
16 cubic feet of waste, Class A, B, and C.

17 And so given that you know, Barnwell has
18 closed, we asked specific RAI, which is, you know,
19 what happens in the short-term or the long-term. So
20 the applicant is in the process of generating
21 responses to the RAI. So we have received one
22 response and we are expecting another one.

23 CONSULTANT WALLIS: Why is there so much
24 waste? Is it because it is all bound up with things
25 that they used to clean it up or something?

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1 MR. DEHMEL: No, it is about average. It
2 is about twice of what you would generate by PWR.
3 PWR is about 5,000 to 7,000, 8,000 cubic feet per
4 year. BWR is about 15,000, 16,000 cubic feet per
5 year. So it is right on the average right now where
6 the estimates based on the DCD.

7 CHAIR CORRADINI: And it is mainly though
8 resins. It is things related to water chemistry and
9 housekeeping within the plant.

10 CONSULTANT WALLIS: It is so big because
11 it is caught up in something else which initially
12 wasn't contaminated.

13 MR. DEHMEL: Yes, it is a combination of
14 dry waste and wet waste, which consists of resins,
15 spent resins, and spent filters, and filter sludges.
16 Yes, that is correct.

17 So here we have two confirmatory items
18 are still open having to do with adding in the FSAR
19 application, the proper citation of the final NEI
20 generic PCP templates, and also correcting some
21 improper references in the use of Low-Level Liquid
22 Waste Management Systems, which were part of an
23 earlier design of the DCD, which is no longer the
24 case now.

25 MEMBER ABDEL-KHALIK: So did I

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1 misunderstand the statement made earlier by the
2 applicant that they have ten years' worth of storage
3 capacity?

4 CHAIR CORRADINI: Twenty.

5 MEMBER ABDEL-KHALIK: No. No, for the
6 solid waste.

7 MR. DEHMEL: No, it is not a mistake.
8 Are you asking me or are you asking --

9 MEMBER ABDEL-KHALIK: I am asking both of
10 you.

11 MR. DEHMEL: Our understanding right now,
12 based on the partial response to this RAI is that
13 some modifications will be made to radwaste building
14 to actually being able to store solid waste for ten
15 years.

16 MEMBER ABDEL-KHALIK: Okay.

17 MR. DEHMEL: And we have not received the
18 full detail of how the building will be internally
19 reconfigured to be able to store radwaste for ten
20 years.

21 MEMBER ABDEL-KHALIK: Okay, thank you.

22 CONSULTANT WALLIS: It is 150,000 cubic
23 feet; 15,000 times ten?

24 MR. DEHMEL: No, no, no. It is only a
25 subset of the waste that is described in Chapter 11.4

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1 of the DCD. Remember, there is an outlet for Class A
2 waste. So, all the Class A waste that will be
3 generated, there is an outlet for it for disposal.

4 CHAIR CORRADINI: Which site?

5 MR. DEHMEL: The site in Utah.

6 CHAIR CORRADINI: Oh, that place.

7 MR. DEHMEL: Yes, EnergySolutions. It
8 used to be Enviocare. So that Class A waste will go
9 over there and Class B and C waste will be, the
10 smaller amount will be stored outside. And that is
11 the extent of storage capacity that is supposed to be
12 addressed by the applicant in the future revision of
13 the FSAR.

14 MEMBER ABDEL-KHALIK: And of the 15,000
15 cubic feet per year, what does that constitute Class
16 B and C?

17 MR. DEHMEL: It is about 20 percent of
18 the volume, from what I recall. Typically the
19 numbers are two percent as Class B and C waste under
20 the classification of Part 61, 10 CFR 61. It
21 represents about 20 to 25 percent of the volume. It
22 represents about 80 percent of the activity. That is
23 kind of the magic numbers to remember with respect to
24 how you want to look at low-level waste Class A, B,
25 and C distributions.

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1 It varies, obviously from, these are kind
2 of industry averages. If you look at DOE NIMS
3 database, which is accessible on the web and, you
4 know, there are the numbers. Look at different types
5 of plants and so on.

6 MEMBER ABDEL-KHALIK: So we are talking
7 about roughly 3,000 cubic feet per year. And this
8 storage building has to handle ten years' worth?

9 MS. BORSH: As a minimum, that is what we
10 are designing to, yes.

11 MR. DEHMEL: The applicant has also made
12 commitments to further reduce the generation of Class
13 B and C waste by improving the operational programs
14 in the plant and being more careful, improving all
15 our programs, being careful about fuel performance
16 and so on. So there are commitments made to not only
17 reduce the amount of Class B waste and store it for
18 ten years but also implement operating procedures
19 that would minimize the amount of radioactive waste.

20 MEMBER ABDEL-KHALIK: I guess I am still
21 trying to reconcile the statement made by the
22 applicant and the statement that you made earlier
23 that you typically have only six months' worth of
24 storage onsite. Where is that discrepancy?

25 MR. DEHMEL: Wait a minute. I understand

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1 your question and the confusion.

2 The DCD right now says that there is --
3 the radwaste building is sized to handle six months'
4 worth of storage. That is a statement made by GE in
5 the ESBWR.

6 MEMBER ABDEL-KHALIK: Okay.

7 MR. DEHMEL: What the applicant has done
8 or is about to do is make a case to us that they have
9 reconfigured the internal design of the radwaste
10 building and through various operational methods and
11 techniques, they will be able to increase the storage
12 capacity up to ten years for Class B and C waste,
13 while there is an outlet for Class A waste for
14 disposal.

15 MEMBER ABDEL-KHALIK: Okay.

16 MR. DEHMEL: In a nutshell, that is the
17 clarification.

18 MEMBER ABDEL-KHALIK: Thank you.

19 MR. DEHMEL: Okay, 11.5. Section 11.5
20 addressed the plant and site-specific provisions for
21 sampling liquid and gaseous streamers all as effluent
22 releases.

23 Basically, it is an expansion of the
24 information that is already provided in DCD by making
25 it site-specific now with respect to some of the

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1 systems that are contained located outside of the
2 buildings. For example, the condensate storage tank.

3 If you have a spill on condensate storage tank, what
4 would be the issue about sampling what will prevent
5 releases to the environment.

6 And so there are, it is an expansion of
7 the sampling program described in the DCD which is
8 generic and now taking that table, fairly lengthy
9 table, in the DCD and making it site and plant-
10 specific to reflect from point of design changes that
11 the applicant has adopted in the FSAR presented.

12 And again, with respect to the operation
13 program, there is an adoption of the NEI templates
14 47-09 with respect to the opening of a site-specific
15 ODCM. So again, this is sort of an internal
16 milestone until the license condition is met under
17 FSAR Section 13.4.

18 And there are no cost-benefit analysis
19 required for the Process Release and Monitoring
20 System under current existing NRC guidance.

21 MEMBER ABDEL-KHALIK: Any lessons learned
22 from Braidwood as far as monitoring effluent release
23 points?

24 MR. DEHMEL: That this system has a very
25 short discharge pipe. It doesn't have the kind of

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1 design features that were the cause of the spills in
2 Braidwood. It is simple discharge pipe into the
3 discharge canal. There are no -- it is a very
4 complicated system at Braidwood.

5 It is a very simple system. There are a
6 series of tanks, imagine a series of processing
7 equipment, filters, generalizer, charcoal filters,
8 liquid is processed to there. It goes to a holdup
9 tank, a sample tank. It is processed. Meaning, it
10 is circulated.

11 It is sampled, it is analyzed. An
12 assessment is made as to whether any of the tank can
13 or cannot be discharged given the concentration of
14 liquid. Then a release rate is established,
15 radiation monitoring alarm point is set, and then the
16 pumps and valves are opened and the discharge allowed
17 to proceed. Very simple.

18 CONSULTANT WALLIS: Into?

19 MR. DEHMEL: Into the discharge canal,
20 into the waste treatment facility, and then
21 ultimately to leak out.

22 MEMBER ABDEL-KHALIK: Go ahead, please.

23 MR. DEHMEL: We have two confirmatory
24 items in Chapter 11.5. Again, the appropriate
25 reference of the current ODCM, as well as adding a

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1 reference to a DCD table on liquid effluent sampling.

2 So we are now in a conclusion portion of
3 this. And basically on again 11.1, we find the
4 incorporation by reference the source term
5 acceptable, based on a review of the applied
6 radioactive effluent source term and confirmation of
7 offsite dose results, which will be described later
8 on in this afternoon when we go over Chapter 12.

9 The Liquid Waste Management System,
10 similarly, we determined that the COL information
11 items that we cited started to be resolved in FSAR.
12 The applicant has met the ALARA criteria Section II.D
13 of Appendix I to do a cost-benefit analysis whether a
14 system is necessary like the one \$1,000 person per-
15 rem cost-benefit ratio.

16 As a result of that, we also confirmed
17 that the collective doses that were calculated in
18 Chapter 12 were correct. And I will talk about this
19 this afternoon.

20 And similar conclusions were reached for
21 Chapter 11.3 on a Gaseous Waste Management System
22 regarding the SRP guidance and the requirement of
23 Part 50 as well. We reached the same conclusion with
24 respect to the cost-benefit analysis based on the
25 collective doses presented in Chapter 12 in that no

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1 further augments on the system.

2 Next page. On Section 11.4, the
3 applicant has adequately addressed the standard COL
4 information items, addressing for example the
5 compliance with Reg Guide 8.8 and 1.143, IE Bulletin
6 80-10 and associated elements of the PCP as they are
7 related with the SECY-05-0197 and General Letter 89-
8 01.

9 MEMBER ABDEL-KHALIK: If you go back to
10 the previous slide, for both the Liquid Waste
11 Management System and the Gaseous Waste, the second
12 bullet in each, is that a precise statement where you
13 say that does that confirm the results site-specific
14 cost-benefit analysis in that either the gas or
15 liquid waste management system augment is not
16 expected to further reduce population doses with 80
17 kilometers? It doesn't matter what you do, you are
18 not going to reduce the dose or you are not going to
19 reduce it within the cost constraints?

20 MR. DEHMEL: Yes. Absolutely. I mean,
21 you could additional equipment and you could reduce
22 the dose.

23 MEMBER ABDEL-KHALIK: So this statement
24 is just half a statement.

25 MR. DEHMEL: It is in the context of what

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1 the threshold, the cost-benefit ratio, that is
2 specified in Part 50 of Appendix I Section II.D to be
3 \$1,000 per person-rem.

4 So, if you are less than \$1,000 per
5 person-rem, you have to do it. If you are above it,
6 you don't have to.

7 MEMBER ABDEL-KHALIK: I understand. I
8 fully understand. I was just questioning whether
9 this statement in and of itself is correct.

10 MR. DEHMEL: Yes, because here are the
11 results of my analysis. Here are my spreadsheets.

12 CONSULTANT KRESS: I think the not
13 expected might better --

14 CONSULTANT WALLIS: It is just about
15 wording, isn't it?

16 CONSULTANT KRESS: Yes. It is the
17 wording he is concerned about.

18 CONSULTANT WALLIS: It is the wording you
19 are concerned about?

20 MEMBER ABDEL-KHALIK: I mean, it is
21 nonsensical when you make a statement like this.

22 MR. PAUL: Jean-Claude, he is saying --
23 this is Mark Paul, Dominion. It looks like an
24 absolute.

25 MEMBER ABDEL-KHALIK: Within a given

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1 cost, I can understand that.

2 MR. DEHMEL: Yes, I understand. Maybe it
3 warranted more.

4 MEMBER ABDEL-KHALIK: Thanks.

5 MR. DEHMEL: I see your point. I
6 understand. Well taken.

7 All right, going back to Section 11.4,
8 again, we were able to confirm with respect to the
9 standard COL information items that they were
10 satisfied. We have an open RAI in the second bullet
11 there on low-level waste storage and we are waiting
12 for additional information from the applicant on
13 that. This is again, you know, a six month versus
14 ten year type of storage. And again, modifications
15 will be made to the radwaste building to accommodate
16 ten years' of Class B and C storage.

17 And the applicant has met the ALARA
18 criteria because the liquid and gaseous effluent will
19 be captured by the Liquid Waste Management System and
20 radwaste and Gaseous Waste Management System. And
21 that was discussed in Chapter 11.2-3 cost-benefit
22 analysis.

23 For Section 11.5, the applicant has
24 adequately the standard COL information items on the
25 DCD. They all focus, essentially, on the Offsite

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1 Dose Calculation Manual and some supporting COL
2 information item certification.

3 The applicant has described a process
4 through Process Radiation Monitoring instrumentation
5 and sampling to control and monitor releases of
6 liquid and gaseous effluent releases to the
7 environment. So this is the table I was referring to
8 that essentially is plant and site-specific now.

9 We have two confirmatory items open. One
10 of these specific references and we find the use of
11 NEI Generic Template ODCM acceptable, with respect to
12 fulfilling this interim milestone until a plant and
13 site-specific ODCM is prepared in response to a
14 licensed condition in Section 13.4.

15 So in summary, if we look at the entire
16 Chapter 11, we have one RAI open on the level of
17 storage and we have four confirmatory items open on
18 the updating reference citations. That is all I
19 have.

20 CHAIR CORRADINI: Questions by the
21 committee?

22 Okay, I thank both Dominion and their GEH
23 colleague as well as the staff. And we will be back
24 here after lunch at 12:30.

25 (Whereupon, at 11:32 a.m., a lunch recess was taken.)

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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(12:32 p.m.)

CHAIR CORRADINI: So, let's get started.

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1 Tom, you wanted to start off with a couple of
2 comments?

3 MR. KEVERN: Yes. A comment, please.
4 Yes, a follow-up to my opening comments this morning.
5 We were reading that both the application and the
6 SER based on Revision 1 that was submitted in
7 December of this past year. And we are doing an
8 update, where possible, to address RAI responses that
9 came in since that time. There was one exception to
10 that, which was in a low-level radwaste which caused
11 a little bit of confusion before and I want to make
12 sure that that is clarified.

13 For that particular issue, we did issue
14 an RAI, as Jean-Claude mentioned earlier. And not
15 only did Dominion provide a partial response, they
16 also actually provided part of a revision to their
17 FSAR in that area. So what you heard Gina referring
18 to was the content of this revision dealing with the
19 ten years' worth of storage. But I think the fact
20 that this was part of that revision to the FSAR was
21 kind of missed by not everyone listening. And so
22 that was the nuance there that I wanted to clarify.

23 That is the only instance of that.
24 Everything else we are talking about are responses,
25 either complete, incomplete, or whatever, to RAIs

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1 since that December time frame. So, thank you.

2 CHAIR CORRADINI: Gina, are you going to
3 start us off?

4 MS. BORSH: Yes. Let's talk about
5 Chapter 12, which is radiation protection. We added
6 supplemental information to all of the DCD sections
7 in Chapter 12. And I will go over those with you and
8 start with 12.1.

9 12.1 is ensuring that occupational
10 radiation exposures are as low as reasonably
11 achievable. Here we described our ALARA program by
12 incorporating two NEI templates. We incorporated NEI
13 07-08, which is the generic template for maintaining
14 exposures as low as reasonably achievable and NEI 07-
15 03, which is the radiation protection program
16 descriptions.

17 The SER for 07-08 has not been issued yet
18 but it is scheduled to be issued shortly. And the
19 SER for 07-03 on rad protection was issued in March
20 of this year. The templates are incorporated into
21 the appendices in Chapter 12, 12A(a) and 12B(b).

22 Then we added, to address the COL item in
23 12.1, we added a commitment to comply with Reg Guides
24 8.8, 8.10, and 1.8. These are Reg Guides on ALARA
25 and on the training qualification program. And

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1 basically, the way we are doing that is by
2 incorporating the NEI templates.

3 In Section 12.2, plant sources, we
4 identified the contained sources that are outside the
5 scope of the DCD and we explained the controls that
6 we are going to apply to these controlled sources.

7 Then in 12.2, which is still about plant
8 sources but this is a subsection on airborne releases
9 and doses offsite, what Jean-Claude was talking about
10 earlier, we evaluated the annual radioactive airborne
11 releases for Unit 3 during normal operations and
12 determined the annual airborne offsite doses and
13 concentrations.

14 We determined that the doses are within
15 the limits of 10 C.F.R. 50 Appendix I. The sections
16 are shown here II.B and II.C. We also determined
17 that no augments are required for the gaseous
18 effluent releases and, therefore, we are compliant
19 with 10 C.F.R. 50 Appendix I. This is what we talked
20 about earlier.

21 And then we also compared the
22 concentrations of the gaseous effluence with the
23 limits in 10 C.F.R. 20 and found that we complied
24 with the specified limits there.

25 CONSULTANT KRESS: This sounds to me like

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1 it is strictly for the ESBWR plan.

2 MS. BORSH: That is correct. And we will
3 get to the combined --

4 CONSULTANT KRESS: You are going to get
5 to it.

6 MS. BORSH: -- a few slides later.
7 Correct. Yes, that is absolutely right. This is
8 just about Unit 3 for now. Okay?

9 So, the information that I was just
10 talking about, as you can see in the left margin,
11 they are addressing both COL items that come from the
12 DCD and a couple of COL items that come from our
13 Early Site Permit that was issued by the NRC. Next
14 slide, please.

15 Now this slide also addresses an ESP COL
16 item that we addressed in the COLA. Here, we are
17 required to make a comparison, and this is what Jean-
18 Claude was talking about earlier, a comparison of our
19 ESP applications, gaseous effluent concentrations and
20 doses to those that are specific to our chosen
21 technology, which as you know is the ESBWR. And the
22 reason we have to do that is because of what Jean-
23 Claude explained before. Right? That we have a
24 composite set of values that are in the ESP versus a
25 Unit 3 ESBWR specific set of values.

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1 So we did the comparison and what we
2 found is that for the concentrations for each
3 radionuclide, each value is bounded by the
4 concentration for that nuclide in the ESP
5 Environmental Report.

6 So, that is comparing our ESBWR Unit 3
7 value, specific values to the ESP Environmental
8 Reports values. Everything is bounded by the ER, the
9 ESP. Okay?

10 CONSULTANT KRESS: And the implications
11 of that is that your Early Site Permit is fine.

12 MS. BORSH: Correct.

13 CONSULTANT KRESS: But you are still
14 redoing everything based on the actual values.

15 MS. BORSH: Exactly. That is right. The
16 actual values for Unit 3.

17 CONSULTANT KRESS: Yes, okay.

18 MS. BORSH: Then what we also found was
19 that the total Unit 3 gaseous effluent release
20 activity is going to be much less than the composite
21 activity that we had considered in the ESP
22 Environmental Report.

23 MEMBER ARMIJO: By much less, what do you
24 mean? Factor of five, two, ten?

25 MS. BORSH: Let me ask our subject matter

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1 expert.

2 MEMBER ARMIJO: Okay.

3 MS. BORSH: Ken Jha, would you like to?
4 Ken Jha, you have to come up to the microphone.

5 MR. JHA: Well, I will look up the number
6 and then I will come up. How about that?

7 MS. BORSH: That would be great.

8 MEMBER ARMIJO: Order of magnitude.

9 CONSULTANT KRESS: Much less usually
10 means a factor of ten.

11 MS. BORSH: Is it okay if he looks it up
12 and then get back with you?

13 MEMBER ARMIJO: Sure, that's fine.

14 MS. BORSH: Thank you, Ken.

15 All right. So going on to the next
16 slide, we did a comparison of our ESP application to
17 the Unit 3 doses now. And as I was explaining
18 before, that was required because of the composite
19 values that we had in or ESP.

20 CONSULTANT KRESS: You just ratioed the
21 amounts of release, multiplied the doses by that.

22 MS. BORSH: Let's talk to Ken to get a
23 specific answer for you. Is that okay?

24 CONSULTANT KRESS: Yes.

25 MS. BORSH: And Charles, it is J-H-A, is

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1 how you spell Ken's last name.

2 MR. JHA: Yes, Ken Jha, Bechtel. What
3 was the question?

4 CONSULTANT KRESS: The question was you
5 have got different nuclides being released compared
6 to what was in the ESP to get the actual redoses. Is
7 this ratio the amount of release of each nuclide and
8 multiplied that as a ratio?

9 MR. JHA: To come up with the doses?

10 CONSULTANT KRESS: Yes.

11 MR. JHA: What we did was we actually ran
12 the gas code, computer code for the gaseous effluent
13 doses and lab tab for liquid. So we didn't do a
14 ratio of what was the dose. We actually went through
15 the regression process of calculating doses.

16 CONSULTANT KRESS: Okay, thanks.

17 MS. BORSH: You are used to looking for
18 order of magnitude, right?

19 CONSULTANT KRESS: Yes.

20 MS. BORSH: Okay, thank you.

21 CONSULTANT KRESS: Thank you.

22 MS. BORSH: Okay, so what we found is
23 that the annual doses were lower, are lower, for the
24 Unit 3 specific values than those that were in the
25 ESP Environmental Report. But we do have a variance

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1 from the Early Site Program because what we found was
2 that the doses for some pathways aren't lower than
3 the doses that are in the ESP Environmental Report.
4 And this is because there were some reductions in the
5 distances to the maximally exposed individual
6 receptor locations.

7 However, what we did find is that the
8 annual total body dose does meet the Appendix I limit
9 and so the variance is acceptable.

10 Going on in 12.2, this is now, that was
11 all about gaseous effluence. Now we are going to
12 talk about liquid releases and doses offsite. And
13 what we are showing on this slide is that we did the
14 same thing for the liquid releases. We evaluated the
15 annual releases for Unit 3 during normal operations.

16 MEMBER ABDEL-KHALIK: On the previous
17 graphs, these reductions in distances, these came
18 about as what, modification for the site boundary or
19 modification of the placement of the footprint of the
20 plant on the site?

21 MS. BORSH: Let me look at that for a
22 second.

23 Well, Geoff, do you want to answer it?
24 Geoff Quinn or Ken, do you want to answer and explain
25 it to the professor?

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1 MR. JHA: This is better surveying
2 methods that we used to identify some of the
3 receptors. We used GIS to locate the receptors. So
4 based on that, there was a slight change to the
5 receptor locations.

6 MEMBER ABDEL-KHALIK: It's just knowing
7 where the people are.

8 MR. JHA: I'm sorry?

9 MEMBER ABDEL-KHALIK: Just finding out
10 better where the people are.

11 MR. JHA: Yes. And also, I am not sure
12 about this but there might have ultimately been a
13 change in the nearest --

14 MS. BORSH: Nearest residence.

15 MR. JHA: -- residence actually. There
16 was a new person who moved in or something, yes.

17 MEMBER ABDEL-KHALIK: Okay, thank you.

18 MS. BORSH: Question?

19 CONSULTANT KRESS: Where do the liquid
20 releases go?

21 MS. BORSH: To the --

22 CONSULTANT KRESS: Where do the liquid
23 radiations go?

24 MS. BORSH: To the discharge.

25 CONSULTANT KRESS: Into the basin?

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1 MS. BORSH: Eventually they will go into
2 the lake but right now they are going into the
3 discharge canal. Okay?

4 CONSULTANT KRESS: Sure.

5 CONSULTANT WALLIS: Have you decided
6 about swimmers, about boating and swimming in terms
7 of -- are the swimmers excluded from the region where
8 you put the discharge into the lake?

9 MS. BORSH: Oh, I see.

10 CONSULTANT WALLIS: Or can people boat
11 and swim near your discharge into the lake?

12 MS. BORSH: Well all of our, we are
13 staying within the limits that are specified in the
14 regulations overall.

15 CONSULTANT WALLIS: Okay, so you don't
16 actually look at who is actually there. Some global
17 requirement of some sort.

18 MS. BORSH: You mean because they are at
19 a closer, they are nearer to the plant than they
20 might be --

21 CONSULTANT WALLIS: Well, I just sort of,
22 I just picked up on this expression about boating and
23 swimming in Chapter 12 and I was wondering. You
24 don't take account of where people actually swim, do
25 you?

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1 MR. HICKS: Yes, we do. Yes, we do.
2 There is some assumption as to the amount of time
3 that is spent swimming and boating.

4 CONSULTANT WALLIS: And where they do it,
5 too.

6 MR. HICKS: Well, the assumption is it is
7 in the lake.

8 CONSULTANT WALLIS: The lake is mixed?

9 MR. HICKS: And it is simple dilution
10 factor is of five.

11 CONSULTANT WALLIS: Oh, okay. So they
12 can swim right at the discharge and they are okay.

13 MR. HICKS: Essentially, that is right.

14 CONSULTANT WALLIS: Oh.

15 MR. HICKS: Yes, with a very simple
16 dilution of factor of five. That is what it amounts
17 to in the end, yes.

18 The pathways that are covered are fish
19 ingestion, invertebrate consumption, drinking,
20 shoreline activities, swimming and boating. They are
21 kind of traditional exposure pathways that are
22 specified by the Reg Guide and Reg Guide 1.206.

23 CONSULTANT WALLIS: But a very global
24 sort of thing. Do you advise people about how many
25 fish they can eat?

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1 MS. BORSH: They can eat as many fish as
2 they would like and be okay.

3 CONSULTANT WALLIS: That's okay.

4 MS. BORSH: There are no issues about
5 public health and safety and we are staying well
6 within the limits of the regulations.

7 CONSULTANT WALLIS: Okay, thank you.

8 MS. BORSH: All right. So now we are
9 talking about liquid releases. We did the same sort
10 of evaluation and what we found was that our offsite
11 doses complied with 10 C.F.R. 50 Appendix I. We
12 didn't need any augments for the liquid effluent
13 releases as we talked about for Chapter 11. We are
14 complying with Appendix I, Section II.D. And the
15 concentrations for the liquid releases are within the
16 10 C.F.R. 20 limits. So there are no variances
17 required from the ESP on that.

18 Now this is a comparison of ESP
19 application to the ESBWR Unit 3 specific liquid
20 effluent concentrations. And here we have another
21 variance. We found that the total annual release
22 activity is less than the total composite release
23 activity that we have in the ESP Environmental
24 Report. But we found that for some radionuclides, the
25 activities aren't bounded by the values that are in

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1 the ER. However, the total release activity is less
2 than the total composite activity in the ER. And the
3 concentrations of all the radionuclides are within
4 limits.

5 The annual liquid effluent doses for the
6 Unit 3 for all the pathways are lower than the ESP-
7 ER. And the annual doses to the maximally exposed
8 individual from the liquid effluents are lower than
9 those in the ER. So we are within the limits that
10 were established in the ESP.

11 Now, this is compliance, Tom, with 10
12 C.F.R. 20.1301. So what we did was we evaluated all
13 of the offsite doses due to Units 1, 2, 3 and our
14 ISFSI, our Independent Spent Fuel Storage
15 Installation. And we used updated -- there is a
16 variance here because we used updated doses for Units
17 1 and 2 to characterize the doses from the existing
18 units and the total offsite doses, compared to what
19 we had in our ESP. And we found that all of the --
20 when you combine all of that, the doses to members of
21 the public comply with 20.1301.

22 Now this is compliance with 20.1302 and,
23 basically, in order to comply with this and meet the
24 dose limits for members of the public, we
25 demonstrated that through surveys of radiation levels

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1 and through calculated total effective dose
2 equivalent, making sure that that is within limits.

3 12.3 is radiation protection. We have
4 incorporated the DCD by reference, of course, and
5 then we addressed access to very high radiation
6 areas. And we discussed airborne radiation
7 monitoring instrumentation. What it is. Where it
8 is. How we are using it.

9 12.4 is dose assessment. Here, we
10 evaluated the annual collective doses to construction
11 workers. And the dose that, excuse me, we reviewed
12 the analysis was provided in the ESP Environmental
13 Report, along with more recent information, such as
14 the most recent effluent release data from Units 1
15 and 2 and we determined that the dose that we
16 calculated in the ESP-ER is still a conservative
17 estimate for the annual collective dose to the
18 construction work force. So, it remains valid.

19 CONSULTANT WALLIS: Then in 12.3, there
20 is something about zinc injection. Are you going to
21 say anything about that?

22 MS. BORSH: We are going to talk about
23 zinc injection in Chapter 9, Graham.

24 CONSULTANT WALLIS: It appears in 12.3,
25 though, doesn't it?

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1 MS. BORSH: Well, --

2 CONSULTANT WALLIS: Why have I written it
3 down in 12.3?

4 MS. BORSH: It might. I am sure you are
5 right.

6 CONSULTANT WALLIS: We will talk about it
7 some other time?

8 MR. EUDY: We do have a section in
9 Chapter 9 for zinc injection.

10 CONSULTANT WALLIS: Oh, I should wait
11 until we get to that?

12 MR. HICKS: I can --

13 MS. BORSH: Okay. So, we did 12.4. 12.5
14 is the Operational Radiation Protection Program. And
15 here we incorporate by reference the NEI template
16 that was developed to describe the radiation program
17 with NEI 07-03. And the SER for that was issued by
18 the NRC in March of 2009.

19 We have two open items in Chapter 12.
20 One of them covers revisions to address the
21 minimization of contamination, including
22 incorporation of NEI 08-08, which is going to be a
23 standard template that we will be using to describe
24 our program. And then there is an RAI that NRC is
25 tracking that we have and we are responding to

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1 monitoring the construction site for radiation.

2 And that is it.

3 MR. JHA: I have the answer to that
4 question on slide five. It stated that the total
5 activity for the Unit 3 is much less than what is in
6 the ESP-ER. The ESP-ER has, in Table 5.4-7, the
7 total activity that is released is 1.8 times 10^4 .
8 And in this, in the COLA, in Table 12.2-17R, the
9 total is 4.6 times 10^3 . So, it is more than a factor
10 of 10 lower.

11 MS. BORSH: Thank you, Ken.

12 MR. HICKS: Tom, you asked about doses,
13 too. There is a Table 12.2-203 that has the total
14 site doses for the maximum exposed individual and it
15 shows you the global site, as well as existing units
16 compared to the --

17 MS. BORSH: Okay. So now, Ilka, and
18 Charlie and Jean-Claude.

19 MS. BERRIOS: We are going now to the
20 staff presentation on the Chapter 12. This slide
21 shows you all the people that have been working for
22 the SER with open items on Chapter 12. And Charlie
23 Hinson is the lead reviewer and Jean-Claude was the
24 supporting reviewer.

25 I am going to leave you with Charlie

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1 Hinson for the technical presentation.

2 MR. HINSON: Okay. Hi, my name is
3 Charlie Hinson.

4 Chapter 12 is composed of five sections.

5 In the DCD, GEH added an additional section 12.6 to
6 address the issues of 20.1406. And so the FSAR
7 followed suit and in the original FSAR, there were 12
8 sections. However, we have asked GE and also North
9 Anna to take the information in 12.6 and put it into
10 12.3. So in my presentation, I will be describing
11 what was presented in 12.6 as part of 12.3.

12 This slide just shows the COL information
13 items and the variances and the supplemental
14 information in Chapter 12. There are 10 COL items on
15 the occupational side that I reviewed and three that
16 Jean-Claude reviewed.

17 And this is simply a list of regulations,
18 Reg Guides that the staff used in reviewing Chapter
19 12.

20 Okay. This is a list of the NEI
21 templates that were generic to Chapter 12. These
22 templates are intended to provide a complete generic
23 program description for use in developing COL
24 applications. The first template, 07-03 was actually
25 developed by NEI starting in 2005 prior to the

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1 development of Reg Guide 1.206. Once Reg Guide 1.206
2 was issued, this information that is in this Reg
3 Guide was supplemented and also had some industry
4 supplement to form what is currently NEI 07-03, which
5 was approved in the spring of this year.

6 And this Reg Guide essentially, excuse
7 me, this NEI supplement template is used to provide
8 the information that North Anna references for
9 section 12.5 and some of it in 12.1.

10 The NEI template 07-08 primarily contains
11 information on our material that would be normally
12 addressed in Section 12.1 for the SRP. And then the
13 most recent of these templates which is still under
14 staff review is NEI 08-08. And this was used to
15 address information in Section 12.3 that I told you
16 before was originally 12.6.

17 And one of the information -- go back
18 one. Sorry. I just wanted to mention that the
19 review of the North Anna RCOL benefited from the
20 staff's involvement in the development of these
21 templates. Since these two what we use are being
22 done concurrently by the staff over the last couple
23 of years. So, some of the issues that we found in
24 reviewing the North Anna FSAR resulted to changes to
25 the NEI template.

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1 Okay, the first section in Chapter 12 is
2 entitled "Ensuring That Occupational Radiation
3 Exposures Are ALARA." The staff confirmed the
4 applicant's commitment to having effective ALARA
5 policy by evaluating the applicants ALARA policy
6 considerations, which ensured that the ALARA program
7 is consistent with guidelines of Reg Guides 8.8,
8 which is information relevant to ensuring
9 occupational exposures are ALARA.

10 8.10, operating philosophy for
11 maintaining occupational exposure is ALARA. And Reg
12 Guide 1.8, which lists the qualifications and
13 training of personnel for nuclear power plant
14 requirements.

15 The staff also evaluated the applicant's
16 operational considerations, including the methods for
17 planning and accomplishing work and the interfaces
18 between the radiation protection department and
19 operation maintenance and other departments in the
20 plant, to ensure that radiation protection measures
21 are integrated into the planning and conduct of work
22 at North Anna.

23 The staff also ensured that the
24 operational considerations such as work preparation
25 and planning and job surveillance follow the

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1 applicable guidelines of Reg Guides 1.8 and 8.10, and
2 also 8.8.

3 The staff asked an RAI for the applicant
4 to describe the procedures to ensure that exposures
5 would be ALARA during operation of the Inclined Fuel
6 Transfer System as part of the DCD design. Since
7 this was not specifically pointed out in NEI 07-03
8 and the applicant assured us that the procedures
9 govern use of the inclined fuel transfer to and fuel
10 movement will be ALARA and will address the proper
11 conditions for spent fuel movement and storage. And
12 this information was also discussed in FSAR sections
13 9.1 and 13.5, with respect to procedures.

14 The staff confirmed that the applicant
15 had successfully addressed the four COL items
16 associated with 12.1 and the applicant referenced
17 templates 07-08 and 07-03 in addressing these COL
18 items.

19 And there are two confirmatory items in
20 Section 12.1.

21 In 12.2, the staff evaluated the
22 applicant's description of contained radioactive
23 sources. Initially, the FSAR said that these sources
24 would be used for calibration and radiography. And
25 in response to a staff RAI, the applicant also stated

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1 that these additional sources would also be used as
2 check sources in the plant.

3 The calibration sources that will be used
4 will be traceable to NIST or equivalent. And
5 radiography sources that are brought onsite will be
6 surveyed upon entry to the site.

7 The staff asked an RAI to ensure that the
8 radiation protection procedures used to maintain
9 control over these sources would be put in place and
10 they confirmed that.

11 This information in Section 12.2
12 acceptably addresses the single COL item that is
13 associated with Section 12.2 and there are no open
14 items in this section.

15 And the evaluation of the airborne and
16 liquid sources for environmental consideration, which
17 is 12.2.2 will be addressed after my presentation by
18 Jean-Claude.

19 Okay, Section 12.3 is entitled "Radiation
20 Protection." As you saw on the applicant's slide,
21 the two items addressed were verifying that -- well,
22 excuse me. Placement of portable airborne monitors
23 and high radiation areas. The staff asked an RAI for
24 each of these issues. The staff asked the applicant
25 to verify criteria for placement of the portable

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1 airborne monitors and to justify the number of
2 monitors that would be used at the site. And the
3 applicant stated that this information was provided
4 in NEI 07-03.

5 The staff also asked the question about
6 the description of the additional controls for very
7 high radiation areas that would be used at North Anna
8 to comply with the requirements of 10 C.F.R. 20.1602
9 and to facilitate the applicant's response to this
10 NEI modified template 07-03, to provide a description
11 of additional access controls for very high radiation
12 areas.

13 The following section was moved from 12.6
14 to 12.3 and this was the information in response to
15 20.1406 and it is addressed in part by NEI template
16 08-08. And the staff evaluated the applicant's
17 operational program and facilities procedures for
18 operation to meet the requirements of 20.1406. And
19 in doing so, the applicant committed to minimize
20 facility contamination, minimize contamination of the
21 environment, facilitate decommissioning --

22 CONSULTANT WALLIS: This word "minimize"
23 is really overused. I mean, you don't minimize
24 anything until you have some function and you reach
25 an extreme. I mean, minimize just meaning reduce.

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1 It is not the right use of the word. They are trying
2 to reduce it as reasonable as possible but they
3 aren't minimizing anything.

4 MR. HINSON: Right. Well, I mean, that
5 is the word. Right.

6 CONSULTANT WALLIS: Absolutely minimum is
7 presumably zero.

8 MR. HINSON: Exactly, yes.

9 CONSULTANT WALLIS: Okay. They are
10 trying to reduce it to as low as they can. It is
11 ALARA idea but nothing is being minimized. Thank
12 you.

13 MEMBER ABDEL-KHALIK: Now the additional
14 access controls to very high radiation areas, is
15 there anything beyond what currently exists onsite?

16 MS. BORSH: What we are using for our
17 existing?

18 MEMBER ABDEL-KHALIK: Right for access
19 controls to very high radiation areas. Is there
20 anything new here that you don't currently have?

21 MR. HINSON: I can -- yes. What we were
22 looking for was we wanted the applicant to list all
23 of the very high radiation areas in the layout
24 drawings and to list the controls associated with
25 each of these areas and to describe any monitoring

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1 that would be provided to these areas. And so the
2 wording in 07-03 was not that detailed. And when we
3 reviewed this application, you know, we said that
4 they need to provide more information in 07-03 to
5 describe these controls.

6 So, it is not anything that is not done
7 at normal operating plants but the description in 07-
8 03 was not fully comprehensive itself.

9 MEMBER ABDEL-KHALIK: Again the question,
10 is there anything unique about Unit 3 that you don't
11 currently have in Units 1 and 2 in terms of access
12 controls?

13 MS. BORSH: Well, generally it is
14 consistent with what we are doing now for our
15 existing units.

16 CONSULTANT WALLIS: But this solid fuel
17 transfer thing is different, isn't it?

18 MS. BORSH: It is not about the -- I was
19 referring to the admin controls that we use, not
20 necessarily --

21 CONSULTANT WALLIS: But the way you
22 actually treat that is different because it is a
23 different design.

24 MS. BORSH: You mean the admin controls
25 that will apply?

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1 CONSULTANT WALLIS: Well you just apply
2 some controls to the new design and that works fine.

3 MS. BORSH: Yes, right.

4 MR. HINSON: Yes, I mean, the fact that
5 it is not a horizontal tube with a single area to
6 access it means that it runs through five elevations
7 and there is hallways and access ways that pass by
8 this tube on various elevations.

9 CONSULTANT WALLIS: So you have to
10 monitor more areas.

11 MR. HINSON: Right. And there is two
12 areas that you can go in to access the tube, instead
13 of one. So yes, there is a lot more concern about
14 that.

15 CONSULTANT WALLIS: The fuel is spent
16 longer in there or anything like that?

17 MR. HINSON: No. I mean, there is a
18 possibility of moving two elements at the same time
19 through the tube. But just the fact that it
20 traverses through several different levels and
21 different compartments, the staff was very concerned
22 about areas from the drawings where the shielding
23 didn't look adequate.

24 Okay, concerning the evaluation of
25 20.1406, the staff asked the applicant to, the staff

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1 asked GE to address how they are complying with
2 20.1406 and also to describe any COL conditions that
3 may come out of this evaluation. And we also asked
4 GE to provide a listing of site-specific areas.

5 So the question that we asked is for the
6 applicant when GE responds to this question, if they
7 identify any additional supplemental or COL items,
8 then the applicant must address these COL items. And
9 the applicant also must address any site-specific
10 areas that would be covered by Reg Guide 4.21, which
11 is the Reg Guide the staff prepared for 20.1406.

12 So the review of the above information
13 showed that the applicant had suitably addressed the
14 two COL items associated with 12.3. The COL item on
15 very high radiation areas will be deleted by GE
16 because it is addressed in Section 12.5 under 07-03.

17 So, it is currently listed as a COL item but in
18 future regs, it will be deleted and it will be
19 covered in 12.5. So there is two COLs listed but
20 there will probably just be one. And like I said
21 before, the information provided in this section is
22 referenced by NEI Template 08-08.

23 And there is one open item and two
24 confirmatory items. The slide lists three
25 confirmatory items but when we went through a couple

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1 of these confirmatory items that were listed are
2 identical to ones that were addressed in 12.1. So
3 12.3 had one of those such items. So there is really
4 two COL items, two confirmatory items for 12.3
5 instead of three.

6 Okay and 12.4, the dose assessment, the
7 doses to construction workers, as Gina said, were
8 addressed in the Early Site Permit ER and they were
9 assessed in the ESP-FEIS in December of 2006. And
10 when North Anna submitted their application, they
11 stated that there were a couple of changes to the
12 data collected since the ESP was evaluated.

13 So the staff asked a number of RAIs,
14 asking for more details on what the exchanges were.
15 And one of them was that the applicant had used more
16 recent TLD data for the years 2003 to 2007. And this
17 resulted in an average increase to the dose to
18 construction workers from 24 millirem a year that was
19 assumed in the ESP to 28 millirem per year.

20 Also the applicant could use the latest,
21 which was 2006 annual operative release reports in
22 submitting that SAR. And the staff found that this
23 really provided no increase in dose contribution over
24 the 2001 data that was used prior.

25 The applicant also stated that they are

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1 going to be using different cask designs in the ISFSI
2 and the staff asked a question on this. And it turns
3 out that the new cask designs will hold the same
4 amount of fuel as the original ones that they are
5 using and there will be no increase in dose rate for
6 these new cask designs.

7 And then the final change that was made
8 was the estimated peak number of construction workers
9 that would be onsite for the year was changed from
10 5,000 people per year to between 2,500 and 3,500
11 people a year.

12 So, when you analyze the increase in the
13 TLD data, the increase by 4 millirem per year,
14 coupled with a decrease in the construction workers,
15 you get a range of potential annual dose to a worker
16 from 73 to 101 person-rem and this is bounded by the
17 120 person-rem that was included in the FEIS of the
18 ESP. So, there is no concern there.

19 A recent question that the staff issued
20 was for the applicant to describe a program to ensure
21 that the construction workers would be continuously
22 monitored during the construction period to ensure
23 that the estimated dose of 24 or 28 millirem per year
24 would be monitored and that there would be no causes
25 for -- you know, if there were any more increases to

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1 these workers, that they would be evaluated by the
2 licensee. And this is an open RAI that we haven't
3 received a response back from the applicant.

4 So, 12.4 has no COL items and one open
5 item that I just talked about.

6 Okay, Section 12.5, the staff confirmed
7 that the applicant had an acceptable radiation
8 protection program by evaluating the following areas.

9 We looked at the operational program milestones,
10 which are addressed in FSAR Section 13.4. And 13.4
11 describes four milestones for implementing the
12 radiation protection program. And there are 13
13 elements that are included in 07-03 that comprise the
14 radiation program. And the staff asked the applicant
15 to describe at which phase, which milestone each of
16 these elements would be implemented. And the
17 applicant responded and said all except for the
18 radwaste disposal element would be addressed by Phase
19 III, which is before fuel load.

20 And to facilitate the response to this,
21 NEI modified the Template 07-03, to clarify when each
22 of these elements would be implemented in the
23 milestones.

24 The staff also looked at the management
25 policy and verified its consistence with the guidance

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1 provided in Reg Guides 8.8 and 8.10. The staff
2 looked at the plant organization, which is discussed
3 in FSAR Section 13.1 and it states that the
4 qualification and training of the site personnel are
5 consistent with the guidance in Reg Guide 1.8.

6 And we also looked at the facilities
7 instrumentation and equipment and we evaluated the
8 adequacy of the facility's instrumentation and
9 equipment to support the implementation of the
10 radiation protection program and found that the
11 number of equipment instrumentation was sufficient.

12 And finally the staff looked at the
13 procedures which were described in FSAR Section 13.5.

14 And the staff verified that the applicant will
15 develop radiation protection procedures to provide
16 adequate control over the receipt, possession, use,
17 transfer, and disposal of byproduct source and
18 special nuclear material in accordance with
19 applicable requirements of Part 19, 20, 50, 70, and
20 71.

21 So the review of the information in
22 Section 12.5 acceptably addresses the three COL items
23 associated with this section. And the applicant, as
24 I stated, referenced NEI Template 07-03 in preparing
25 Section 12.5.

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1 And there are no confirmatory items in
2 Section 12.5. This again was, the one that was
3 listed on the slide was really a duplicate of one
4 that was in 12.1. And so there is really no
5 confirmatory items.

6 So the total number of confirmatory items
7 for my area is four. And there are three open items.

8 Okay, and this concludes my presentation.

9 MR. DEHMEL: All right. Regarding the
10 effluent releases or associated doses to offsite
11 members of the public in the context of Chapter 12, I
12 touched upon why this information is presented in
13 Chapter 12 as opposed to Chapter 11 earlier this
14 morning. I also talked a little bit about the source
15 terms.

16 So basically the focus of the staff's
17 review involves three main areas: The estimates of
18 the annual radioactive effluent releases; the use,
19 the application of plant and site-specific
20 information with respect to how does that feed into
21 the dose assessment analysis itself; and the dose
22 calculation methodology.

23 So, starting at the top here again with
24 effluent releases. So, the releases identified in
25 Chapter 12 as opposed to those that are identified in

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1 Chapter 11.1, the source term, are expressed in
2 curies per year. So the difference between 11.1 and
3 12.2 is that the current situation expressed in the
4 tables of Chapter 11.1 of the DCD represents expected
5 annual average concentration of primary coolant and
6 primary steam without the benefit of any processing
7 and treatment, while the releases expressed in
8 Chapter 12 in curies per year take into account those
9 concentrations and passes this material to, for
10 example, the Liquid Waste Management System with the
11 appropriate DS, the liquid effluent, and filtration.

12 And for gaseous effluents, it goes to mainly to the
13 old gas system for the purpose of capturing and
14 retaining noble gasses and capturing and retaining
15 the iodine. That is the major difference.

16 So what we did here for Chapter 12.2 on
17 the source term curies per year, we went back and
18 made sure that none of the source term that was
19 doubled up for the ESP was applied. So in essence,
20 the appropriate source term was the one that is
21 identified in DCD, not in ESP. So, we checked for
22 one percent verification of all the entries really
23 implied, and specific curies per year for all of the
24 radionuclides identified in the DCD, Chapter 12.2 and
25 making sure they were properly transposed in the FSAR

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1 corresponding section.

2 Regarding plant and site-specific
3 information and assumption, there again we made sure
4 there was some appropriate parameters that were
5 carried forward from the DCD and also the appropriate
6 site-specific and parameters such as the atmospheric
7 dispersion and deposition factors, site-specific
8 aquatic dilution factors, and other assumptions
9 associated with the plant use data. The idea is that
10 in this case that the similar analysis that are in a
11 DCD are not applicable because the DCD assumes a
12 fictitious site.

13 Now here we have a site. We have
14 information from the prior land-use census supporting
15 the operation of Units 1 and 2 and we obviously have
16 to move it to make sure that those parameters, those
17 input data are properly applied for Unit 3.

18 We also look at the assumption of those
19 contributions from direct external radiation, namely
20 nitrogen-16 from the turbine building and external
21 radiation from the ISFSI facility for Units 1 and 2.

22 We also look for site-specific offsite
23 dose receptor locations, pathways, and land-use data,
24 again, based on information that characterizes a
25 similar type of exposure for Units 1 and 2. And then

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1 we looked at supporting information identified again
2 in the DCD in FAR section 2.3.5., where the
3 atmospheric dispersion and the position parameters
4 are derived. And we are simply the end users of this
5 information and I believe but however, you will be
6 presenting information on the corresponding section
7 of the SER on the basis of both short-term and long-
8 term
9 chi over Q and D over Q.

10 MEMBER ABDEL-KHALIK: I'm sorry. Excuse
11 me. Maybe I misinterpreted what you said. You used
12 data from exposure from Units 1 and 2 to extrapolate
13 to which Unit 3 is for the turbine building?

14 MR. DEHMEL: Yes. It is not an
15 extrapolation. Imagine that we have two -- let's
16 step back a moment and look at Units 1 and 2, for
17 example. They are emitting releases, both liquid and
18 gaseous, collectively. And both plants are releasing
19 this, but they are both competing for the same dose
20 receptor. In other words, we have one nearby
21 resident. You have a resident garden located nearby.

22 And all essentially the doses have been received at
23 those points. So there are dose receptors and
24 specific exposure pathways associated with those
25 receptors.

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1 Now, we are now going to add a third unit
2 to this. Right? But we are not changing the outside
3 dose receptors because exposures remain the same,
4 whether or not there is a local garden, whether or
5 not there is somebody doing some swimming and
6 boating. So we want to make sure that in the result
7 of the current land-use census, the one that is
8 conducted yearly for Units 1 and 2, the same
9 information has to be applied for Unit 3. Just
10 because we are adding Unit 3, we just cannot reach
11 out and identify yet another receptor. They have to
12 be the same.

13 So all three plants, essentially, are
14 sharing and competing for the same offsite dose
15 receptor. So, with the land-use census being the
16 most up-to-date one, we have compared that with as
17 well the information that was presented in the
18 Environmental Report. And we want to make sure that
19 information was consistent and made sense, given the
20 current result of a land-use census.

21 Did I make that any clearer?

22 MEMBER ABDEL-KHALIK: Yes. Thank you.

23 MR. DEHMEL: Okay. And then we also look
24 at the Departure Report and as I mentioned earlier,
25 the appropriate sections of the Environmental Report,

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1 Section 5.4.

2 And the imbedded in this are the two COL
3 items that were flashed earlier on the list having to
4 do with the COL action items on the CDC with respect
5 to having to do dose calculations for the offsite
6 receptor based on actual site data. That is for
7 liquid and gaseous effluent releases.

8 And then there was another COL from the
9 Early Site Permit, which states that when the Early
10 Site Permit and with the ER, there was some exposure
11 patterns that weren't included. For example, cow
12 milk, cross-cow milk pathways not identified. So
13 there was an action item in the Early Site Permit
14 that said at a time of the COL application, the
15 applicant should determine whether or not the
16 exposure pathways have changed and if so, they should
17 be added to the updated environmental report
18 analysis, as well as updated to the FSAR.

19 And then there were the three variances
20 that we talked about earlier.

21 So given all that, we, in essence,
22 duplicated the analysis. We essentially conducted
23 our own analysis using the GASPARG and the LADTAP
24 codes and confirmed that the results were acceptable,
25 in compliance with Part 20 with respect to the

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1 effluent concentrations of Table 2 and then with
2 respect to Appendix I, the three and five millirem
3 per year for the whole body and the ten to 15
4 millirems per year for organs, and also made the
5 determination in compliance with the 40 C.F.R. Part
6 190 for the dose from all three plants contributing
7 to that single offsite dose receptor, that is the 25,
8 75, and 25 millirem per year.

9 Because as you may remember, the Appendix
10 I dose calculation and dose criteria are per plant
11 unit only, while the 40 C.F.R. Part 190 requirements
12 for the entire site. So there, it is an assessment
13 of all three plants combined contributing to a dose
14 to a receptor, to a single receptor.

15 CHAIR CORRADINI: But that second one is
16 more limiting in this case, I would assume. The one
17 your quoted, the 40 --

18 MR. DEHMEL: 40 C.F.R. 190, yes. It is
19 more limiting than Part 100, that is correct. I
20 mean, 10 C.F.R. 20, which is 100 millirem per year
21 and this is 25 millirem per year for the whole body.

22 CHAIR CORRADINI: Okay.

23 MR. DEHMEL: But with respect to the
24 calculation methodologies, this is really simple
25 mechanically. Once you have identified all of the

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1 parameters, we would then plug them in and turn the
2 crank and out come the results.

3 Now with respect to the conclusions, we
4 were able to confirm independently that the liquid
5 and gaseous effluent releases are in compliance with
6 the -- well, are consistent with the information
7 presented in ER and the DCD, with respect to liquid
8 and gaseous effluent releases. And they were
9 properly applied in calculating offsite doses.

10 With respect to 10 C.F.R. Part 20, we are
11 able to determine that the releases, taking into
12 account the chi over Q and D over Q for gaseous
13 releases, as well as the liquid effluent releases and
14 the appropriate dilution factor for the
15 concentrations, effluent concentration met the Table
16 2 criteria of Appendix D to Part 20. With respect to
17 compliance with 10 C.F.R. 50, we are able to confirm
18 that the dose criteria of the 3 and the 5 millirem to
19 the total body and the 10 to 15 millirem to specific
20 organs were also met in accordance with Section IIA
21 to IIC of Appendix I criteria.

22 And we also were able to confirm in
23 support of the cost-benefit analysis that were
24 discussed this morning for Chapter 11.2 and 11.3,
25 that the dose estimate, collective dose estimate for

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1 the population within 50 miles of the plant were also
2 appropriately correctly determined. Next slide
3 please.

4 And were able to confirm that the COL
5 action items, as well as the ESP COL action items
6 were properly identified and resolved, given the
7 information on dose results and the commitments that
8 were made in the FSAR with respect to calculating
9 doses with respect to the license condition using the
10 ODCM.

11 And we also were able to confirm the
12 variances that were presented in the departures
13 report and confirm that the disposition of the
14 variances were total.

15 So what is left with Chapter 12 is simply
16 one confirmatory item on providing further
17 elaboration on one ESP variance, which was introduced
18 in a table but not really discussed in a text. All
19 the other variances were identified both in the table
20 and the text of the FSAR. One specific variance was
21 identified in the table with no supporting text.

22 So, they provided the text and we found
23 it acceptable. So, ultimately it will show up in Rev
24 2 of the FSAR.

25 And that concludes my presentation.

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1 CHAIR CORRADINI: Questions? Thank you.

2 MR. KEVERN: Yes, wait, please. The ACRS
3 question regarding zinc injection, I think that stems
4 from our SER figures 12-22 and 23, Charlie, regarding
5 the radiological aspect. So, it would be more
6 appropriate to address that here rather than Chapter
7 9, if that is all right.

8 MR. HINSON: Now, essentially, we had
9 noticed that the ESBWR design included an option to
10 utilize a zinc injection system. But when we
11 reviewed the North Anna application, they had elected
12 not to utilize zinc injection. So we asked the
13 question what was their reasoning for not using zinc
14 injection and they responded. And then we asked a
15 supplemental question.

16 And essentially, their response was that
17 they had, the design they had minimized the sources
18 where cobalt could be put into the Reactor Coolant
19 System. They released the amount of cobalt in high
20 fluence areas, such as fuel assemblies and control
21 rods. They had to use non-cobalt alloys for pins and
22 rollers and the control rods. They had reduced the
23 cobalt and stainless steel components in the reactor
24 vessel. And now they are seeing the steel components
25 with large surface areas that are exposed to flow

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1 rates heading toward the core and minimize stellite
2 and high wear components.

3 They also had --

4 CONSULTANT WALLIS: I saw that kind of
5 stuff. And that seemed to me the most telling
6 statement. I mean, they have done all these things.

7 Minimize means nothing. The thing they could have
8 done was to say before we did all those things, the
9 amount of radiation was X and after we did it it was
10 reduced to Y. That means something.

11 But to say that you have done all the
12 things and this has minimized the radiation doesn't
13 really tell me anything. The word means nothing is
14 what I am saying.

15 MR. HINSON: Well, I mean, I think --

16 CONSULTANT WALLIS: Unless you quantify
17 what you had before and what you had afterward, you
18 haven't really told me anything. And that is what I
19 objected to in this statement.

20 MR. HINSON: Okay. Because the staff was
21 also concerned because a lot of --

22 CONSULTANT WALLIS: Was it reduced by a
23 factor of ten or by a factor of two or what?

24 MS. BORSH: Frostie White from GEH, do
25 you have an answer for that?

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1 MR. WHITE: No, I'm sorry, I don't.

2 CONSULTANT WALLIS: Well, it is still a
3 vague statement. It is a qualitative statement.

4 MR. HINSON: Yes, I think one of the
5 areas that was, I guess, convincing in their response
6 was one of the largest sources of cobalt and one of
7 the reasons why BWRs use zinc injections were to
8 reduce the dose rates in the dry well. And most of
9 the dry well dose comes from cobalt deposited in
10 recirculation lines. And so this design has no
11 recirculation lines.

12 CONSULTANT WALLIS: That is fine. That
13 is good.

14 MR. HINSON: And so there is, you know,
15 you are reducing a large part of the source term
16 right there.

17 And staff was concerned. You know, lots
18 of plants try to minimize cobalt. This design is
19 minimizing at the start as opposed to finding turbine
20 blades that have cobalt and replacing them. They
21 have referenced a Japanese plant that doesn't use
22 zinc injection and it was a recent design. And they
23 said that there was no need for injection.

24 Where our concern was that if as a plant
25 operates you do start getting buildup of zinc, for

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1 whatever reasons, we wanted to make sure that they
2 did have capability to use a system.

3 CONSULTANT WALLIS: They have to have an
4 option.

5 MR. HINSON: Yes, and they so they stated
6 that they will. You know, they will monitor levels.

7 And if their levels start increasing, then they can
8 implement --

9 CONSULTANT WALLIS: Now, wouldn't it be
10 nice to have some quantitative numbers and to compare
11 it with some sort of criterion? I mean, yes, they
12 have done something to reduce something but I have no
13 measure of by how much. And I have no measure of by
14 how much it needs to be reduced in order to satisfy
15 some criterion. So it is still very vague. It is
16 just words, in other words.

17 MR. HINSON: Yes, I mean, it is kind of
18 like ALARA. I mean, you keep reducing and reducing
19 and once you get dose rates down so far, like I said,
20 there are certain plants where they find that they
21 have cobalt levels increasing and they can't figure
22 out where they are coming from and there may be
23 turbine blades or other systems where they had no
24 idea that this would contribute. And they reduce a
25 level to such a level and they still have their

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1 increasing components that are contributing.

2 Yes, I agree with you. I was trying to
3 find out if there is any set points which you may
4 think it is not useful but like ALARA, you know, I
5 mean, as they lower the limits and they say well, we
6 still have some sources here so let's tackle this.

7 CONSULTANT WALLIS: But how would they
8 know that they ought to introduce zinc injection? I
9 mean, they expect to have less cobalt and then they
10 run the plant for a while. And then what do they do?

11 Do they have some criteria that says we have cobalt
12 above some level? You start thinking -- how would
13 they make a decision? It is all so vague like this.

14 MEMBER ARMIJO: You find that out during
15 inspections, maintenance, normal monitoring.

16 CONSULTANT WALLIS: There must be some
17 measure you use, though.

18 MEMBER ARMIJO: We don't have a research
19 system, Graham, you don't have a lot of inspections,
20 a lot of repairs, maintenance, all of that stuff
21 builds up and it generates dose. So, if the plant is
22 contaminated, you will know pretty quick.

23 CONSULTANT WALLIS: Well, it is tough to
24 measure more cobalt. Then there is some criterion,
25 is there? Some criterion?

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1 MR. ARCARO: This is Mike Arcaro from
2 GEH. When we get into the Chapter 9 discussion, we
3 will have a representative from GEH Chemistry that
4 can talk to hydrogen water chemistry, zinc injection,
5 and noble chem, if you want to defer some of these
6 questions to Chapter 9.

7 CHAIR CORRADINI: Let's wait until he
8 shows up.

9 CONSULTANT WALLIS: I'll wait. Thank
10 you.

11 CHAIR CORRADINI: Any questions from the
12 committee?

13 Can we not take a break and just start on
14 Chapter 9? And then we will take a break after maybe
15 the Dominion presentation. Is that acceptable?

16 Gina, is that all right?

17 MS. BORSH: Yes, certainly.

18 CHAIR CORRADINI: All right.

19 MS. BORSH: So if anyone wants to leave
20 from Dominion team, she is taking people downstairs.

21 You guys ready?

22 CHAIR CORRADINI: I think you are all
23 set.

24 MS. BORSH: Yes. All right, so let's
25 talk about Chapter 9, Auxiliary Systems. Okay.

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1 CHAIR CORRADINI: Okay.

2 MS. BORSH: We're good? Chapter 9 is
3 auxiliary systems. We added supplemental information
4 to all of the sections in the DCD, except for HVAC
5 and the summary of the analysis supporting the fire
6 protection design requirements.

7 The first section we are going to talk
8 about is 9.1, "Fuel Storage and Handling." In this
9 section, we committed to developing fuel and heavy
10 loads handling procedures, and this included
11 describing the contents and the milestones for
12 completing the work.

13 So for fuel handling procedures, we have
14 explained that we will address topics such as the
15 status of plant systems required for refueling,
16 proper conditions to prevent inadvertent criticality
17 and actions performed for core alterations.

18 Heavy loads procedures we will address
19 topics such as required equipment, inspections, and
20 approved safe load paths and exclusion areas.

21 To address another COL item, we described
22 the requirements for testing and inspection plans for
23 the fuel handling and equipment, such as inspecting
24 the fuel handling equipment before each refueling
25 operation. And we also state that the QA program

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1 described in Chapter 17 will be applied to fuel
2 handling activities.

3 The last item on this slide talks about
4 identifying requirements that are applicable to the
5 cranes and the lifting devices for heavy loads, for
6 handling overhead heavy loads. So we talk about
7 things like procedures that we are going to be using,
8 training and qualification programs, QA program
9 controls. We also make the statement that there are
10 no heavy loads outside the scope of the DCD. They
11 are all contained within the scope of the DCD and
12 there aren't any heavy load -- there isn't any heavy
13 load handling equipment or interlocks for heavy load
14 handling equipment that is outside of the DCD scope.

15 That is all described in the DCD.

16 MEMBER ABDEL-KHALIK: I know dry-cask
17 storage is sort of not a something that you are
18 looking at in the immediate future for this plant,
19 but is this looked at in the DCD as a long-term
20 option to provide? It is no in there at all.

21 MR. HICKS: I think the crane and the guy
22 from GE, I can't remember his name but he's supposed
23 to be on the line, I think the crane is designed to
24 handle some specified --

25 MEMBER ABDEL-KHALIK: The cask.

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1 MR. HICKS: Yes. And who is that?
2 Steve, is the crane guy on the line? Dave?

3 MR. DAVENPORT: Yes, I am here. This is
4 Dave Davenport.

5 MR. HICKS: Did you hear the question on
6 the dry-cask storage?

7 MR. DAVENPORT: Right. There is no
8 mention of dry-cask storage in the DCD, that is
9 correct. But having dealt with a number of utilities
10 in a couple of years as we looked at this, a lot of
11 issues pertaining to handling heavy loads. What we
12 have learned is that there has been some
13 inconsistencies based on how some of the older cranes
14 have been procured. And what we are doing, we are
15 taking a very conservative approach to the
16 procurement requirements for the cranes in that we
17 are going to invoke 10 C.F.R. 50 Appendix B
18 requirements that will allow for the cranes to be re-
19 licensed for things like dry-cask handling and
20 storage.

21 And not having the crystal ball before us
22 to know what things could be asked with the overhead
23 cranes, we are trying to design and procure the
24 cranes such that there will be very, very few
25 limitations. That all the pedigree have gone through

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1 and that there will be a pretty licensing effort to
2 adjust what would be the original licensing
3 requirements for the crane.

4 MEMBER ABDEL-KHALIK: Well you know
5 roughly what the casks for BWR fuel weigh. And I was
6 wondering if that was taken into account in deciding
7 what crane specs you require.

8 MS. BORSH: Dave, can you --

9 MR. DAVENPORT: We didn't take into
10 account handling a dry fuel storage cask but now we -
11 - and that won't happen on the refuel floor. But in
12 the fuel building, you know, we do have the
13 expectation that we will be handling a spent-fuel
14 storage cask. But to, you know, to have made an
15 effort, we haven't compared the weight of what we
16 would try to project a dry fuel storage cask to
17 weigh. We can certainly impose a limitation.

18 MEMBER ABDEL-KHALIK: The issue is
19 whether or not you have agreed to have it.

20 MEMBER ARMIJO: I have a different
21 question. The vessel of the ESBWR is very tall. So
22 you are going to refuel, your fueling is a little
23 more complicated because you have got a much longer
24 reach to lift and assembly and move it around. Is
25 there anything unique in these procedures that you

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1 are having to address that isn't typical of BWRs?

2 MR. HICKS: Yes.

3 MR. DAVENPORT: We have, you know, the
4 height difference in the vessel is to accommodate the
5 chimney partition so that we have a relatively
6 balanced flow-through fuel. The partitions are going
7 to be removed. You know, typical BWRs, we have the
8 separator steam dryer that we have to remove to get
9 to fuel.

10 In our case, we are going to also remove
11 the partitions. And the purpose for that, there are
12 a couple of reasons. One is it is such a tight fit
13 you have got 16 bundles within a particular cell of
14 the partitions. And then you know, that means 12 of
15 those cells are right up against a partition wall.
16 It is going to be really, really tight in there. The
17 other is just to shuffle, we would have to lift fuel,
18 the fuel length plus 21 or 22 feet.

19 So, we are going to certainly have to
20 deal with -- well, we didn't want to have to deal
21 with the partitions so we have made the partitions
22 removable. We will store them in the equipment pool
23 and then it takes away any consideration, you know,
24 anything that is different from other BWRs, with the
25 exception of the distance.

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1 MEMBER ARMIJO: Right and you know, I
2 just wondered if that is a minor challenge or
3 significant in that you have got the boom that is
4 grappling the assemblies is going to be longer and,
5 you know, your positioning is going to be more
6 demanding. I just wondered if maybe it is more of a
7 DCD issue than this.

8 MR. DAVENPORT: Well, those are certainly
9 detailed design issues. And we know we are going to
10 have some additional challenges reaching down as far
11 as we are going to have to reach. That is
12 approximately, that is 27, 30 feet deeper, somewhere
13 in that neighborhood. But we have some advantages in
14 our shutdown cooling flow. We don't expect to be as
15 turbulent in the water.

16 We do know there is a German plant and I
17 can't remember which but they are refueling it within
18 a meter of what we are doing now. And I have talked
19 to some of the GE services folks who have been there
20 and have worked that plant. And we know that what we
21 are going to need to do is achievable. They are
22 doing it with old technology and we have a lot of new
23 tools that we can bring to the table. And we
24 actually don't really perceive that there are any
25 challenges out there that we can't overcome just by

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1 having to reach a little farther.

2 We already have excellent lighting. We
3 already have excellent cameras. We have things that
4 are rad-tolerant. We will try and we will look at a
5 way to stiffen up the mast sections so that there is
6 not as much sway. And those are things we will solve
7 as we get into the detailed design effort more.

8 MEMBER ARMIJO: Okay, thanks.

9 MS. BORSH: Thank you, Dave.

10 MR. DAVENPORT: Oh, you are welcome.

11 CHAIR CORRADINI: So you are going to
12 start with service water. So I have a context for
13 this one that I want to ask about.

14 This is RTNSS system. Right?

15 MS. BORSH: Yes.

16 CHAIR CORRADINI: So at least the way I
17 read a lot of the SER items, particularly 9.2.1-10, I
18 sense the staff wants more information. So I am
19 trying to understand how you guys viewed this system,
20 although it is nonsafety but RTNSS and the
21 specificity of the design. So, that is kind of the
22 context that I am, that at least I was trying to
23 figure out as you are going to go through all this.
24 Because this is probably one of the prime examples.

25 MS. BORSH: Examples of specificity

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1 required for RTNSS system?

2 CHAIR CORRADINI: Well, I sense the staff
3 wants more. You gave them a certain level. They
4 want more because it is falling into this line of a
5 nonsafety system, which has, I guess, the new cost-
6 inflation of RTNSS requirements.

7 MS. BORSH: What we found is generally, I
8 think, that the staff will agree that we are getting
9 closer to resolution on an agreement on level of
10 detail but there are still some outstanding issues.

11 MR. WACHOWIAK: And I would like to add
12 one thing there, to add to your context.

13 RTNSS isn't just one thing. There are
14 multiple ways to get things to require, get
15 components to require regulatory treatment. And I
16 think in the classical sense, we were looking for
17 nonsafety-related things that have a very high
18 importance in the PRA. Right? Looking for those.

19 This particular system doesn't meet that
20 threshold. It is added to address the uncertainties
21 in the PRA. So if you just do the base PRA like the
22 EPRI methodology endorsed in the SECY paper, this
23 service water wouldn't make the cut.

24 CHAIR CORRADINI: Is that because it is
25 supporting these two systems for nonsafety? Is that

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1 the primary reason, I should say.

2 MR. WACHOWIAK: The primary reason is
3 that we have enough other systems that perform
4 similar functions that this wouldn't make the cut to
5 say it is required to keep this core damage frequency
6 below 10^{-4} that is required to keep the large release
7 frequency less than 10^{-6} . However, when you take
8 into account questions in the PRA on the uncertainty,
9 how reliable are the squib valves? Rather than using
10 the mean value, you use some higher value. And how
11 reliable is, are the digital I and C systems? When
12 you take those uncertainties into account, just like
13 the question that came up earlier in the cost-benefit
14 analysis, these were close. They didn't make the cut
15 but they were close enough that if you take into
16 account maybe being on the bad side of some of the
17 uncertainties, it might make the cut.

18 So, this particular set of systems, the
19 water systems are in RTNSS, require the treatment for
20 RTNSS to address the underlying uncertainties in the
21 PRA, rather than being, yes, these are the important
22 systems. The RTNSS system that meets that classic
23 definition is our diverse protection system, which is
24 the diverse commensurate control system.

25 So we just, I think it is important for

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1 everyone with the RTNSS thing is you set the
2 treatment commensurate with the importance of the
3 system. And this system we may be looking at it as
4 in the context of the existing plants need this
5 system as a safety-related system so that the thought
6 is it has got to be important in this plant, too. It
7 is not as important as you may be thinking.

8 CHAIR CORRADINI: So that helps. So the
9 way I understood what you just said is you might be
10 talking to the staff saying well, the level of detail
11 you might expect for a typical current service water
12 system or design may not be what you have ready now
13 but you may not need it just yet because it is not of
14 that level regulatory treatment. Is that what you
15 kind of just said to me?

16 MR. WACHOWIAK: Yes. Right, it is, as
17 Gina's slide says there at the end, that 19A
18 specifies the level of the oversight. We think in
19 the DCD we said it correctly. We have been
20 discussing this back and forth with the staff, as
21 well as Dominion discussing back and forth with the
22 staff. Where does that line actually exist? We
23 think we have got it right and I think there are
24 questions of are you sure you are getting that right.

25 CHAIR CORRADINI: Okay, fine. Thank you.

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1 MS. BORSH: All right. So, what we are
2 showing here on this first slide is information that
3 came from the DCD. This is not information that we
4 added to supplement the DCD, but it is to give you
5 all a little bit of background, although I am sure
6 you are familiar with plant service water.

7 So the function of the system, Plant
8 Service Water System, is to reject heat from the
9 nonsafety-related RCCWS and Turbine Component Cooling
10 Water System. It doesn't perform a safety-related
11 function. As Rick was talking about, it is
12 categorized in the DCD as RTNSS C and DCD 19A
13 specifies the level of oversight that is appropriate
14 for it.

15 And right now, the DCD states for PSWS,
16 we are supposed to be applying the maintenance rule
17 program and the system is included in the design
18 reliability assurance program.

19 MR. WACHOWIAK: And the QA program in
20 Chapter 17.

21 MS. BORSH: That is right. And the QA
22 program that we have established in Chapter 17
23 applies to it also. Thank you, Rick.

24 So, just to give you a little more
25 context, the system consists of two independent 100

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1 percent redundant trains that are continuously
2 circulating water through the RCCWS and the TCCWS
3 heat exchangers.

4 The DCD states that portions of the
5 system are conceptual design information and are the
6 responsibility of the COL applicants. Some portions
7 are within the scope of the DCD. The DCD identified
8 the portions of the system that are within our scope,
9 the Dominion scope, and that basically includes the
10 heat rejection facilities for plant service water.

11 So, at North Anna, we are using the
12 auxiliary heat sink, which utilizes the mechanical
13 draft plume abated cooling towers.

14 CHAIR CORRADINI: So may I have question
15 there so I understand?

16 MS. BORSH: Sure.

17 CHAIR CORRADINI: So, I had help of
18 someone who is not here who looks at details. You
19 might know or remember. So, if I understand
20 correctly, this is a draft cooling tower, which is
21 not the same as the cooling towers we are talking
22 about for the surface. This is a different base and
23 a different set of cooling towers. Right? Okay.

24 And I got a note from Mr. Stetkar that
25 said he read the details and he said that the cross-

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1 tie is not there, which is normally the case. The
2 design change leaves the two force -- how did he ask
3 this? The interconnection between the plant service
4 water system and a normal plant heat sink cross-tie
5 is not there. Is that correct?

6 MR. WEDDELL: This is John Weddell.

7 MS. BORSH: This is John Weddell from
8 Dominion.

9 MR. WEDDELL: That is true, yes. We
10 don't have the cross-tie to a normal plant heat sink.

11 CHAIR CORRADINI: Why was it removed?

12 MR. WEDDELL: Dominion looked at it and
13 really didn't see that it was anything that was cost-
14 effective to us. It appeared to us that we were
15 essentially going to have oversize our normal plant
16 heat sink to handle the additional loads for the
17 normal service water load.

18 CHAIR CORRADINI: If they would happen to
19 open the -- if you had the cross-tie on it would
20 always be open or it would not necessarily be open?

21 MR. WEDDELL: The cross-tie is there for
22 the plant service water to operate on the normal
23 plant heat sink during normal operation.

24 CHAIR CORRADINI: Oh.

25 MR. WEDDELL: So you would actually have

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1 to go off of that for some of these transients to go
2 back to your auxiliary heat removal system.

3 CHAIR CORRADINI: Okay. All right.

4 Okay, thank you.

5 MS. BORSH: Thanks, John.

6 MR. WACHOWIAK: And probably since the
7 source of the question, the PRA that is in the DCD --

8 CHAIR CORRADINI: Well done. That was
9 also a note.

10 MR. WACHOWIAK: -- the PRA and the DCD
11 does not take credit for that cross-tie. It assumes
12 it is not there like North Anna has in their plant.

13 CHAIR CORRADINI: Okay, thank you.

14 MR. HICKS: It is considered conceptual
15 design.

16 MS. BORSH: And also, we are using
17 fiberglass reinforced polyester pipe for the buried
18 portions of the system to preclude long-term
19 corrosion. And then we also, as part of the
20 conceptual design information, we explained that we
21 are going to be doing routine grab samples from the
22 basin of the plant service water system to detect any
23 RCCW leakage and meet the intent of IE Bulletin 80-10
24 about potential contamination of non-radioactive
25 systems.

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1 CHAIR CORRADINI: So, this is a question
2 that is not somebody else's. I was just reading
3 through this. Is it just me that gets nervous about
4 polyester pipe?

5 MS. BORSH: You and one other person.

6 CHAIR CORRADINI: It seems to get me a
7 little bit crazy.

8 MEMBER ARMIJO: It is a matter of how
9 much experience do you have on an industrial scale.

10 CHAIR CORRADINI: Do you have a lot of
11 experience? Yes.

12 MS. BORSH: We have some experience with
13 it and we have done a lot of research. Operating
14 experience throughout the world to get some history
15 on this. And so certainly, John, do you want to
16 address that?

17 MR. WEDDELL: Again, it comes down to the
18 three things. And I understand your reluctance.

19 CHAIR CORRADINI: Thank you.

20 MR. WEDDELL: But is it designed
21 correctly?

22 CHAIR CORRADINI: It's kind of like the
23 movie "Moonstruck." There is copper, there is brass,
24 and then --

25 MR. WEDDELL: It is --

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1 CHAIR CORRADINI: Can you explain to why
2 it is I shouldn't worry about this?

3 MR. WEDDELL: Is it designed properly?
4 It really is with any kind of material. Is it
5 designed properly? Is the material manufactured? Do
6 you have the right kind of controls in manufacturing
7 it? In your installation, again, do you have the
8 right kind of controls and specifications?

9 What we are looking at, of course, now we
10 have American Waterworks Association standards and
11 ASTM standards that we would be using that are now a
12 part of B31.1, our piping code, --

13 CHAIR CORRADINI: Oh, okay.

14 MR. WEDDELL: -- in the Appendix 3.

15 So, we are designing and installing
16 according to the standards.

17 MS. BORSH: Which are new and improved
18 since 30 years ago. Right?

19 MR. WEDDELL: Yes.

20 MS. BORSH: They have been evolving and
21 improving.

22 MR. WEDDELL: Correct, yes. So, we have
23 learned a lot in 30 years. And there are a lot of
24 these installations all around the world.

25 MEMBER ARMIJO: That is what I was

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1 asking. I am not familiar with the operating
2 experience, long-term aging.

3 CHAIR CORRADINI: Well, the aging is what
4 I was worried about.

5 MEMBER ARMIJO: Is it something brittle?

6 MR. WEDDELL: Correct. And it does come
7 down to is the wall thickness correct. You know, is
8 the installation correct for a below ground
9 situation?

10 Yes, so all these things, they would go
11 into the design documents, the procurement documents.
12 There would be proper quality inspections.

13 CHAIR CORRADINI: So to put it
14 differently, what you are really saying is you get
15 superior performance on aging at, hopefully I am
16 assuming, guessing, more modest cost.

17 MEMBER ARMIJO: Maybe not.

18 CHAIR CORRADINI: Or maybe not. I don't
19 know. But I guess that is what I am curious about
20 because I guess we had been talking about other
21 things for current plants on carbon steel and long-
22 term aging and corrosion in cast iron.

23 MR. WEDDELL: Correct.

24 CHAIR CORRADINI: So I was assuming that
25 was why you made the decision. I just have no

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1 experience in it.

2 MR. WEDDELL: Yes, but you have the same
3 kinds of issues with carbon steel or stainless steel.

4 CHAIR CORRADINI: Right.

5 MR. WEDDELL: And it comes down to the
6 same kinds of issues of making sure that they are
7 designed and manufactured and installed correctly and
8 that you have an inspection program to take a look at
9 what is going on there.

10 CHAIR CORRADINI: Okay, thank you.

11 MR. WEDDELL: Which, of course, is where
12 the Maintenance Rule Program comes in.

13 CHAIR CORRADINI: Right.

14 MR. WEDDELL: NQA program, correct, yes.

15 MS. BORSH: Okay And so we talked about
16 the grab samples that we are going to use to prevent
17 -- not to prevent -- to assure that we don't have any
18 contamination of a non-radioactive system with a
19 radioactive system.

20 And as far as our slides, that was all we
21 were going to present about plant service water. We
22 have some open items that the SCR is tracking.

23 Do you have any other questions about
24 plant service water before we go on to Makeup Water?

25 Time is up. Okay.

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1 CHAIR CORRADINI: You are doing fine.

2 MS. BORSH: Am I?

3 CHAIR CORRADINI: We will see you again.

4 Don't worry.

5 MS. BORSH: Okay. And we will talk, of
6 course, Larry is going to talk about that we have
7 open items.

8 All right. So, moving on. Now let's
9 talk about the Makeup Water System. The same thing,
10 this first piece of information is from the DCD but
11 we added supplemental information.

12 So, the function of the Makeup Water
13 System is to supply demineralized water to the
14 equipment that is listed in the DCD. It is a
15 nonsafety-related system. It consists of two
16 subsystems. It has a demineralization subsystem and
17 then a storage and transfer subsystem.

18 Now, it is the same thing. Part of the
19 scope of the system is within the scope of the -- I'm
20 sorry. Yes, part of the system is within the scope
21 of the DCD. Part of the system is within the COL
22 applicant's, Dominion's. And so what we have done is
23 we have described, provided a plan description of the
24 demineralization system, which is our scope,
25 conceptual design information.

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1 We have provided plant-specific design
2 information. We explained that the major equipment
3 for the system is housed in the water treatment
4 building, except for the storage tank, the
5 demineralized storage tank, which is outside, and
6 that the feedwater for the demineralization subsystem
7 is provided by station water. And then we described
8 the process that we used to produce the demineralized
9 water.

10 And then we incorporate the DCD
11 description of the storage and transfer subsystem
12 because that is within the scope of the DCD.

13 Now, the next slide is about potable
14 water and sanitary waste discharge. The functions
15 here is to provide potable water and sewage
16 collection in treatment for normal plant operation
17 and shutdown periods. These are nonsafety-related
18 systems. They are all, the systems are all
19 conceptual design information in the DCD. So we
20 provided our plant-specific design information or
21 descriptions of the systems.

22 And I just wanted to note that obviously,
23 we are meeting the requirements of the codes and
24 regulations that apply to the system, like, you know,
25 effluent discharge limits and things like that.

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1 The ultimate heat sink, we had to add
2 some information to this portion of the DCD to
3 address a conceptual design information piece. But
4 generally, it is described in the DCD. And --

5 CHAIR CORRADINI: Can I ask you a
6 question about, since you are still here, go back up
7 to the Makeup Water System?

8 MS. BORSH: Sure.

9 CHAIR CORRADINI: There was a requirement
10 for makeup requirements from a temporary
11 demineralization subsystem. Do I have that correct?

12 It says in this section, that the makeup
13 water transfer pumps and demineralization subsystem
14 are sized to meet the mineralized water needs of an
15 all-operational condition, except for shutdown and
16 refueling startup.

17 MS. BORSH: Right.

18 CHAIR CORRADINI: During those modes, the
19 increases in plant water consumption require use of a
20 temporary demineralized subsystem and temporary
21 makeup water transfer pumps to be used, as a
22 substitute water source.

23 What requires that? That was a question
24 from a colleague that I missed. He didn't give me a
25 page reference. He just quoted.

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1 MR. HICKS: Additional water
2 requirements?

3 CHAIR CORRADINI: Yes. This is a quote
4 item here. This is a quote out of the COL. It says
5 during shutdown refueling startup mode the increases
6 in plant water consumption require the use of a
7 temporary demineralized subsystem and temporary
8 makeup water transfer pumps.

9 MS. BORSH: So, he is asking --

10 CHAIR CORRADINI: The question is why.

11 MS. BORSH: What would be -- what are the
12 functions.

13 CHAIR CORRADINI: It seems to be unusual
14 and the question is why.

15 MS. BORSH: Steve, this is Gina. Do you
16 have anybody on the line that can -- Mike, can you
17 answer that question?

18 MR. ARCARO: This is Mike Arcaro from
19 GEH. The makeup water system was designed for normal
20 operations during an outage. You will have
21 significantly more makeup requirements to refill IC
22 and PCCS pools. So the idea there was rather than
23 design a huge system for running at partial capacity
24 during outages, we would bring in a temporary offsite
25 water treatment system --

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1 CHAIR CORRADINI: Oh, so on a skid.

2 MR. ARCARO: -- and hook it up to the DI
3 water distribution network and provide those services
4 that are only required during outages.

5 CHAIR CORRADINI: So this is a portable
6 system you bring in during outages.

7 MR. ARCARO: That is correct.

8 CHAIR CORRADINI: Okay. Thank you.
9 Thank you.

10 MS. BORSH: So it sounds like it was
11 financial considerations.

12 MR. WACHOWIAK: And operational.

13 CHAIR CORRADINI: All right. Thank you.

14 MS. BORSH: Okay. All right, so for
15 Ultimate Heat Sink, we provided a milestone and a
16 commitment for developing procedures that will
17 explain how we connect makeup water sources to the
18 Ultimate Heat Sink seven days following an accident.
19 And that is why this slide is here. We hadn't
20 addressed that COL item.

21 All right, Condensate Storage and
22 Transfer System. The DCD explains that the function
23 of the system is to supply condensate quality water
24 to equipment. It is a nonsafety system that is
25 within the scope of the DCD but to respond to a

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1 requirement in the RC guidance, we added a statement
2 that explained that we will have freeze protection
3 for the system.

4 CHAIR CORRADINI: Is it necessary or just
5 a nice added feature?

6 MS. BORSH: It is necessary for North
7 Anna.

8 CHAIR CORRADINI: So do the PRA models
9 include it? Well, if they are not, say dependency,
10 looking at the PRA.

11 MR. WACHOWIAK: Yes, I will have to take
12 a look at that.

13 CHAIR CORRADINI: My colleague thinks it
14 is not there.

15 MR. WACHOWIAK: My sense is that it will
16 be like many of the other auxiliary systems for these
17 different water systems, in that, the failure modes
18 of the freeze protection system are covered by the
19 support systems that we already have. We already
20 require electric power. The freeze system requires
21 electric power.

22 CHAIR CORRADINI: I was just tracing it
23 down to this.

24 MR. WACHOWIAK: Yes, we may miss one or
25 two failure modes but in general, we will have picked

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1 up all of the dependencies. In room cooling, that
2 was certainly the case. And I would expect that this
3 would be the case for freeze protection as well. We
4 will have to take a look at that.

5 CHAIR CORRADINI: Okay. So, that is a
6 table look at thing. All right, thank you. Thank
7 you.

8 MS. BORSH: So on Station Water, this is
9 another system that is within the scope of the DCD
10 but we added some information because part of it is
11 conceptual design.

12 The function of the system is to supply
13 makeup water and feedwater to nonsafety-related
14 systems. It consists of two subsystems. We have the
15 Plant Cooling Tower Makeup System, which provides
16 makeup to the CIRC and to Plant Service Water Cooling
17 Tower Basins. And there is another subsystem that is
18 the Pretreated Water Supply System which supplies
19 feedwater to the makeup water system and fill water
20 to the fire protection system, to the tanks.

21 Okay, next slide. Sorry.

22 So, we are done with the water systems in
23 Chapter 9. We on 9.3, which is other process
24 auxiliaries.

25 In this section, we addressed the COL

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1 item by providing a description of the post-accident
2 sampling program. The program includes use of EOPs,
3 emergency operating procedures, plant procedures for
4 obtaining highly radioactive grab samples, a
5 containment monitoring system and effluent radiation
6 modeling.

7 The next item on this slide is about
8 hydrogen water chemistry. We did -- this is an
9 optional system for the ESBWR design. We chose to
10 include it in our plant-specific design and the
11 functions to add hydrogen to the feedwater system and
12 oxygen is the off-gas system. It is a nonsafety
13 system.

14 And we described in the DCD -- I mean,
15 I'm sorry, in the FSAR, we described the system
16 itself, including the storage facilities, the
17 inspection and test requirements that we are going to
18 be applying to the system. And we also --

19 MEMBER ABDEL-KHALIK: How much hydrogen
20 is stored onsite for operation of this system?

21 MS. BORSH: I think it is in Chapter --
22 excuse me.

23 MEMBER ARMIJO: It is combined with the
24 generator of hydrogen, isn't it?

25 CHAIR CORRADINI: Which is bigger.

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1 MEMBER ARMIJO: Yes.

2 CHAIR CORRADINI: That is the bigger
3 source. Right?

4 MEMBER ARMIJO: Yes.

5 CHAIR CORRADINI: I assume the bigger
6 source --

7 MS. BORSH: It is an 18,000 gallon
8 vessel.

9 MEMBER ABDEL-KHALIK: Over and above what
10 you have for the generator?

11 MS. BORSH: Well, this is the bulk
12 hydrogen storage facility. So, I don't know. Are we
13 using that for the generator also? Do you know,
14 Mike?

15 MR. ARCARO: What was the question again,
16 Gina?

17 MR. KEMP: Yes, we are using it for the
18 generator itself. It is limited. It is a, like you
19 said, a bulk storage can be used for both probably
20 water chemistry, as well as for generator.

21 MEMBER ABDEL-KHALIK: So the overall
22 inventory of hydrogen onsite is not affected by
23 whether or not you have added this system over and
24 above what is prescribed in the DCD.

25 MS. BORSH: Well, would it be a smaller

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1 vessel, Doug, if we were not using hydrogen water
2 chemistry?

3 MR. KEMP: I would expect. It is a
4 consideration of how often you want to refill and
5 loss of hydrogen through evaporation. But I would
6 think most likely it would be a smaller vessel.

7 Hydrogen water chemistry is a much larger
8 user than the generator cooling.

9 MEMBER ABDEL-KHALIK: Really?

10 MR. ARCARO: Typical hydrogen flow rates
11 in the larger BWRs, you know, that have double chem
12 are on the order of 20 to 30 standard cubic feet per
13 minute, if that helps you any.

14 MEMBER ABDEL-KHALIK: And for the
15 generators?

16 MR. SUNDBERG: I am unfamiliar with
17 generator usage. I think it is a lot less, though.

18 CHAIR CORRADINI: And for consistency,
19 you need to identify yourself when you speak.

20 MR. SUNDBERG: I'm sorry. This is Jay
21 Sundberg from GEH in San Jose.

22 MEMBER ABDEL-KHALIK: The underlying
23 reason for my question is that there is a measure
24 change in the inventory of hydrogen onsite. The
25 question is, how does that impact your PRA?

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1 MR. WACHOWIAK: That is something else
2 that I would have to go back and look in the section
3 where we covered the other external events. There is
4 one section in the PRA where we look at the random
5 airplane crashes and industrial facilities, things
6 like that. And we did pretty much qualitative
7 analyses on those types of events. But I don't
8 recall whether or not a hydrogen storage, I guess,
9 breach, is what you are considering here was --

10 MEMBER ABDEL-KHALIK: Right, hydrogen
11 pump.

12 CONSULTANT WALLIS: -- covered under
13 that. I would have to look at that and see what we
14 did and said about that.

15 MR. KEMP: Just for your information, the
16 siting of the storage tank would use EPRI guidance
17 procedures offsets or standoffs from the power block,
18 which is in consideration of a hydrogen explosion
19 that the air pressure at the power block of the
20 building would be less than a certain value. So that
21 that was considered to be sure that you don't have
22 the results of a hydrogen storage explosion impact on
23 the safety related.

24 MEMBER ABDEL-KHALIK: But again, the
25 severity of the explosion depends on the inventory.

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1 That is the underlying answer to the question.

2 MR. KEMP: Right. Exactly, that is part of the
3 EPRI guidance that was considered in the siting of
4 the storage vessel.

5 MR. WACHOWIAK: I will have to look at
6 that in the PRA. And if it was addressed, it
7 probably would have been addressed like that. So, if
8 it meets the guidance, then it is not considered a
9 dominating event and wouldn't be quantified. But I
10 will have to verify that that has been included
11 there.

12 MEMBER ABDEL-KHALIK: Fair enough.

13 MEMBER ARMIJO: It was my understanding
14 that if you use the noble metal addition, that you
15 didn't need as much hydrogen.

16 And the question is, first of all, is
17 that right? And second, if so, is Dominion going to
18 use noble metal addition in conjunction with hydrogen
19 or just hydrogen?

20 MS. BORSH: Jay, do you want to answer
21 the question about the differences? Could you hear
22 the question?

23 MR. SUNDBERG: Yes. When a plant, you
24 know, uses noble metals either from a classic
25 application or an online treatment, the hydrogen

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1 requirements for IGSCC mitigation decrease
2 significantly with noble chem.

3 The volume change may be as much as a
4 factor of five in some of the larger plants. I
5 earlier said it would be something on the order of 20
6 to 30 cubic feet per minute for the ESBWR with the
7 requisite feedwater flow. It could be four to five
8 times as high to achieve comparable mitigation
9 without noble metal treatment. So there you are
10 looking at possibly 150 standard cubic feet per
11 minute without noble chem.

12 MEMBER ARMIJO: So let me ask Dominion
13 again. Are you going to use noble metal in order to
14 minimize that hydrogen?

15 MS. BORSH: Yes, we are using noble chem,
16 online noble chem.

17 MEMBER ARMIJO: Okay. So, this is
18 hydrogen water chemistry with a noble chem, noble
19 metal addition is your plan.

20 MS. BORSH: It is part of our -- yes,
21 part of our system. Yes, that is correct.

22 And then before we leave the hydrogen
23 water chemistry, would you like us to talk about the
24 question that you had about --

25 MEMBER ARMIJO: Yes. It would just seem

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1 to me that it was another system that was high
2 pressure system pumping gas into the feedwater.

3 MR. WACHOWIAK: So, is Tom Walker there?
4 He got the answer for me on the code for the system.
5 If he is not there, I will just relay what he sent
6 to me.

7 MR. SUNDBERG: He is not here, Rick. Go
8 ahead.

9 MR. WACHOWIAK: All right. He took a
10 look in the design spec for it and Tom also coaxed
11 out of the DCD the corroborating information. It is
12 a B31.1 system. It is not a co-class system. And it
13 is connected in the Groove D piping on the feedwater
14 condensate system.

15 I don't recall where the connection is.
16 It is in the Groove D piping. So it makes it a
17 B31.1 system.

18 MR. HICKS: The AMSE Code Class III
19 doesn't go out to feedwater systems.

20 MEMBER ARMIJO: Right.

21 MR. WACHOWIAK: So, Frostie looked up in
22 the PRA while we were talking about the other thing.
23 And yes, indeed, we did address it. And it is like
24 I said. We basically took credit for the requirement
25 that the tank be located sufficiently away from any

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1 equipment that the explosion wouldn't affect the
2 plant. And that is what it says in there.

3 So, as long as it is sited properly in
4 accordance with the guidelines, it wouldn't affect
5 the site-specific PRA. If for some reason they had
6 to put it closer or close to some building that could
7 be affected, then there would be an issue. But they
8 are not doing that.

9 MEMBER ABDEL-KHALIK: And the siting
10 requirement is independent of inventory?

11 MR. WACHOWIAK: I don't think so. The
12 requirement, what you just stated is that there is a
13 pressure at the power block. So, that would be
14 related to inventory.

15 MR. KEMP: I believe there is. It has
16 been a while since I looked at the EPRI guideline
17 when we did this evaluation. But we considered the
18 distance and I thought there were a series of curves
19 which included volumes of storage. But again, I
20 would have to go back and look at the standard or the
21 EPRI guidelines to confirm that.

22 MS. BORSH: Okay, now before we leave
23 hydrogen water chemistry, was there a question that
24 we were holding for Jay on chemistry from earlier or
25 did we catch all of them?

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1 CHAIR CORRADINI: I thought we caught
2 them all.

3 MR. HICKS: It was about the weld codes,
4 I believe.

5 CHAIR CORRADINI: He is still holding one
6 for 9.3 on zinc but that is coming.

7 MS. BORSH: Oh, okay. That was probably
8 it.

9 CHAIR CORRADINI: Somebody is holding
10 that.

11 MS. BORSH: Okay. That was it.

12 CHAIR CORRADINI: That is the next slide,
13 though.

14 MS. BORSH: Yes, that is the next slide.

15 All right.

16 So the next slide is the zinc injection
17 system. We are not using it. It is an elective
18 system in the ESBWR design. Dominion has chosen not
19 to use it. And we have talked about the reasons why.

20 You know, it is used normally in plants where
21 cobalt-containing alloys have been employed to reduce
22 the rates and personnel exposure in coolant system
23 areas.

24 CONSULTANT WALLIS: Well, the cobalt
25 alloys don't reduce dose rates. You said to reduce

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1 dose rates.

2 MS. BORSH: To reduce dose rate.

3 CONSULTANT WALLIS: The way you read it,
4 it sounded as if cobalt alloys were reducing the dose
5 rates.

6 MS. BORSH: Oh, I am so sorry. I am so
7 sorry. I knew I needed a break. Please forgive me.

8 To reduce the dose rates in personnel
9 exposure in coolant system areas. I'm sorry. Thank
10 you.

11 We have concluded that cobalt is not a
12 concern for the ESBWR design for the reasons that we
13 talked about earlier. GE has reduced cobalt and
14 contaminated applications and reduce stainless steel
15 in the coolant system. GE has also, the water that
16 is flowing past the stainless steel CRDMs is filtered
17 prior to injection into the vessel and we don't have
18 any reactor coolant recirc loops in the ESBWR design,
19 which is a major source in the existing BWRs.

20 So but we have retained the possibility
21 of installing a zinc injection system, if we
22 determine later that it is necessary.

23 MEMBER ARMIJO: Now, do you have
24 experience from, I guess the ABWR, which doesn't have
25 a recirc lines and all the associated equipment, have

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1 you found, and this is to GEH, have you found that
2 the dose rates just aren't significant?

3 MR. SUNDBERG: This is Jay Sundberg
4 again. None of the operating ABWRs currently utilize
5 zinc injection, where every North American and
6 several European BWRs are using it.

7 From the data that I have seen so far,
8 the ABWR does have, you know, the advantage of
9 tighter cobalt controls on a number of materials and
10 reduced stellite inputs. And as a consequence, the
11 utilities have found that, you know, that the dose
12 rates in the ABWR are a lot better than the BWR-2
13 through BWR-6 machines. This is not to say that
14 there won't be some cobalt-60 issues with ESBWR, even
15 though it doesn't have the recirc loops and
16 associated piping, which are the biggest contributors
17 to occupational exposure during outages.

18 There are other areas, such as reactor
19 water cleanup system where there will be some cobalt-
20 60 uptake and a dose rate issue, possibly.

21 A wait-and-see attitude is, I think,
22 appropriate here. After several years of operation,
23 you can determine the buildup rate of dose on these
24 auxiliary systems and later make a determination
25 whether to use depleted zinc oxide or not.

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1 MEMBER ARMIJO: Thank you.

2 MS. BORSH: Okay, let's talk about fire
3 protection. This is in 9.5 of the FSAR. We added a
4 list of the codes, standards, and regulatory guidance
5 that are applicable to the portions of the system
6 that are outside of the scope of the DCD or that
7 relate to the operational aspects of the system.

8 The next bullet is that we provided
9 simplified diagrams of the site-specific firewater
10 supply piping. We identified the primary and
11 secondary water sources for North Anna system. The
12 primary source for the water that is going to the
13 firewater storage tanks is the pre-treated water
14 system, as we talked about earlier. And the
15 secondary water source is the basin or Lake Anna.

16 We provided milestones for completing the
17 design, testing, updating of the fire hazards
18 analysis, training, personnel, and implementing the
19 fire protection program. We described the fire
20 protection staffing and the Fire Brigade
21 Organization.

22 Next slide.

23 CONSULTANT WALLIS: Was it you who said
24 that you are using administrative controls instead of
25 fixed automatic suppression in the main control room

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1 complex? I wasn't sure why administrative controls
2 were an adequate replacement for a fixed automatic
3 suppression.

4 Is this one of these recent things that
5 we looked at from fire protection regulations and
6 make that decision?

7 I don't think that fixed automatic
8 suppression would be appropriate on a lengthy flow
9 rate.

10 MR. WACHOWIAK: No. That is a DCD
11 question, I believe.

12 CONSULTANT WALLIS: That is a DCD
13 question?

14 MR. WACHOWIAK: And I don't remember when
15 recently that could have been brought up in the DCD.

16 CONSULTANT WALLIS: I think it was in the
17 SER, I picked this up in 9.5.1-4.

18 MS. BORSH: Mike Arcaro, do you have an
19 answer to Graham's question?

20 MR. ARCARO: I think, I guess the only
21 place that I can think of is -- this is Mike Arcaro,
22 GEH. We added some controls for say the main control
23 room under floor areas and to limit combustibles in
24 those areas because we were taking exception and
25 didn't have suppression systems in those areas.

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1 So I think that might be where we are
2 taking credit for administrative actions.

3 MS. BORSH: But that is within the scope
4 of the DCD. Right? Is it within the scope of the
5 DCD, Mike?

6 MR. HICKS: Well, they took the
7 exception. And I think what Graham read was that we
8 then have to develop the controls to implement.

9 MS. BORSH: Oh, there it is.

10 CONSULTANT WALLIS: So you then, have to
11 develop the controls.

12 MR. HICKS: Yes, I think like Mike was
13 saying, the exception was actually in the DCD.

14 CONSULTANT WALLIS: We'll ask the staff.

15 MR. ARCARO: Yes, and the reason we took
16 the exception is because it is not applicable. You
17 know, it is not similar to existing control rooms.
18 You know, we don't have miles of electrical cable and
19 combustibles in there. You know, it is just
20 different. The control room for ESBWR is a different
21 design than earlier vintages.

22 CONSULTANT WALLIS: I guess we will ask
23 the staff why that is acceptable when we get to that.

24 MS. BORSH: Okay. All right.

25 MR. RADLINSKI: I have something.

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1 MS. BORSH: Okay, Bob.

2 MR. RADLINSKI: This is Bob Radlinski. I
3 am the Fire Protection Branch Chief and I did the
4 review for the ESBWR. And I just wanted to make the
5 point that that is a consistent approach that is
6 being used by all of the reactor designs,
7 Westinghouse, the USAPWR and EPR. They are all
8 taking that exception and the staff finds it
9 acceptable.

10 CONSULTANT WALLIS: But this is an
11 exception which is, I think we went through this, I
12 am trying to remember, a couple of years ago or
13 something which is now okay by the staff. I think
14 the ACR has looked at this, debates about that.

15 MR. RADLINSKI: But we have never
16 provided guidance that provides suppression system in
17 the control room proper. Okay? Just it was
18 suggested to be considered underneath the raised
19 floor and also in the areas adjacent to the rooms
20 around the main control room.

21 CHAIR CORRADINI: But not in the control
22 room.

23 MR. RADLINSKI: Not in the control room
24 itself.

25 CONSULTANT WALLIS: It is in the complex.

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1 MR. RADLINSKI: But that is also an
2 exception that has been taken by all of them.

3 CONSULTANT WALLIS: It is a staff thing?

4 MR. RADLINSKI: Yes.

5 CONSULTANT WALLIS: Okay.

6 MEMBER ABDEL-KHALIK: Now, the Fire
7 Brigade Organization is a site-wide organization?

8 MS. BORSH: Oh, Mark or Paul? Let me
9 look at that. Can we back to you on that?

10 MEMBER ABDEL-KHALIK: My question
11 pertains to the difference between Units 1, 2, and 3
12 and whether that has any impact on the Fire Brigade
13 Organization.

14 MS. BORSH: We will get back with you on
15 that. Because you know, generally, there is some
16 distance. It is not like Units 1 and 2 --

17 MEMBER ABDEL-KHALIK: Yes, I do
18 understand.

19 MS. BORSH: So I don't know the answer.
20 As soon as Mark returns, we will ask him. Okay?

21 Okay. All right. So, we are still on
22 slide 14.

23 So, we made a commitment to control the
24 combustible materials, the hazardous materials and
25 the ignition sources that are on the site.

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1 We added, we adjusted COL item be
2 explaining that QA controls are going to be applied
3 to activities that affect the fire protection
4 systems. We are going to be using the requirements
5 of Reg Guide 1.189 as our basis for the QA Program.

6 We provided details on the fire barriers
7 and the electrical raceway fire barrier systems that
8 we are going to be installing. And finally, we
9 committed to developing procedures for manual smoke
10 control as part of the Fire Protection Program
11 implementation.

12 Now we are on Emergency Communications.

13 CHAIR CORRADINI: We'll take that up once
14 he returns.

15 MS. BORSH: Yes, thank you. Okay.

16 Emergency Communications. We described
17 the onsite and offsite emergency communication
18 systems that we are going to have for North Anna 3.
19 We are going to have the emergency notification
20 system, the health physics network, communication
21 from the control room, and TSC, and the EOF to NRC
22 headquarters. Crisis management and fire brigade
23 radio systems, transmission system operator
24 communications link, and an Insta-Phone System that
25 we can use to contact state and local authorities.

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1 CHAIR CORRADINI: I have to ask, what is
2 an Insta-Phone? I have no idea what that means.

3 MR. EUDY: It is cutting edge.

4 CHAIR CORRADINI: Is that like Tweet?

5 MR. WHEELER: I can answer that. Larry
6 Wheeler with the NRC staff. I was a chief technical
7 advisor at Surry. An Insta-Phone is essentially a
8 phone that you pick up and you are instantly
9 connected to the state and the local governments.

10 CHAIR CORRADINI: Like a Red Phone.

11 MR. WHEELER: Just like that.

12 CHAIR CORRADINI: It is a Red Phone.

13 MEMBER ARMIJO: You don't dial. You
14 don't do anything.

15 MR. WHEELER: It is very similar to a
16 phone that you are going to be connected to all of
17 your county agencies and the state all at the same
18 time.

19 CHAIR CORRADINI: Okay.

20 CONSULTANT WALLIS: If you pick it up and
21 it answers and it says if you want so-and-so press 1,
22 if you want --

23 (Laughter.)

24 CHAIR CORRADINI: Let's go on. That was
25 good. That was good.

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1 MS. BORSH: All right. Diesel Generator
2 Fuel Oil Storage and Transfer Systems. Okay, this
3 information comes from the DCD. The function of the
4 system is to supply fuel oil to the standby and
5 ancillary diesel generators.

6 There is no safety-related function
7 associated with this system. The Standby Diesel
8 Generator Fuel Oil Storage and Transfer Subsystem is
9 categorized in the DCD as RTNSS C. And the Ancillary
10 Diesel Fuel Oil Storage and Transfer System is
11 categorized as RTNSS B.

12 CHAIR CORRADINI: Will you remind me,
13 since we have not RTNSS experts on our side today, B
14 and C?

15 MEMBER ARMIJO: B is tougher than C.

16 CHAIR CORRADINI: B is tougher than C?

17 MS. BORSH: Let's see.

18 CHAIR CORRADINI: Can you explain it
19 relative to service water, since you already told us
20 --

21 MR. WACHOWIAK: The letter is identifying
22 which sub-bullet in the SECY paper that caused it to
23 become RTNSS. And B is associated with non-safety
24 systems that perform a safety function only after 72
25 hours has elapsed. And C are those things that are

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1 brought into RTNSS for some probabilistic purposes.

2 CHAIR CORRADINI: And service water is
3 neither of those.

4 MR. WACHOWIAK: Service water is C.

5 CHAIR CORRADINI: Oh.

6 MR. WACHOWIAK: But it was on the --

7 CHAIR CORRADINI: I understand.

8 MR. WACHOWIAK: -- very edge C. And just
9 like the diesel, the standby diesel generators are
10 there to support the FAPCS the same as service water.
11 And so it is on the edge C.

12 And the ancillary diesel generators are
13 the power source, onsite power source that is going
14 to be used after 72 hours to keep the vent fans
15 running, control room ventilation running and, as a
16 backup way to put water in the upper storage pools.
17 So that is a safety function after 72 hours.

18 CHAIR CORRADINI: Thank you.

19 MS. BORSH: Okay, thank you. Next slide.

20 CONSULTANT WALLIS: Do you have
21 requirements on the temperature of this storage
22 system? Do you heat it or anything like that in the
23 winter or do you treat the diesel oil? Diesel oil
24 sits around for a long time at low temperatures.
25 Then it becomes something like chloroform.

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1 MR. WACHOWIAK: That is correct. And so
2 by its nature of being in RTNSS, you pull in quality
3 requirements for the system. And part of it is
4 reasonable assurance that it will operate in the
5 environment that it is subject to. And so you would
6 use the QA Program for RTNSS defined in Chapter 17 to
7 specify your fuel oil. And then the fuel oil I would
8 expect to be monitored as well under the maintenance
9 program.

10 MS. BORSH: Isn't it in the ACM also?

11 MR. WACHOWIAK: Yes. That is an
12 extension of your maintenance rule.

13 MS. BORSH: Okay. All right, to address
14 the COL item in this section, we provided a milestone
15 and a commitment to develop procedures to ensure that
16 we have sufficient fuel oil for standby and ancillary
17 diesel generators. And we also addressed another COL
18 item by describing the corrosion protection system
19 that we are using for the underground carbon steel
20 piping that is part of the system.

21 And then finally for fire protection,
22 there is a Fire Hazards Analysis in the DCD, Appendix
23 9A and we provided site-specific information for that
24 analysis, you know, providing the buildings, the
25 codes, the figures, drawings on where we are and

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1 milestones for concluding the work.

2 And the next slide. There are eight open
3 items associated with Chapter 9. Six of them are
4 related to Plant Service Water System. Larry will
5 cover them in more detail but one of them is about
6 the use of fiberglass piping in the system. Another
7 is about the composition of the system's materials,
8 Plant Source Water System materials. And there is a
9 question about application of the maintenance rule to
10 Plant Service Water System and that also has an
11 associated question about how the chemical addition,
12 a question on the design of chemical addition and
13 where it is added to the Plant Service Water System.

14 Then there was an open item about, it is
15 a formatting item in the FSAR. Which information in
16 the FSAR is replacing conceptual design information
17 and which information is part of the DCD. NRC has
18 asked that we identify that more clearly.

19 There is a question about our ITAAC for
20 the Plant Service Water System. And then finally,
21 there was a question about the testing that we are
22 going to perform to verify the AHS meets its
23 requirements.

24 And then there were two questions about
25 the Diesel Fuel Oil System and one of them is about

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1 what are the specific margins that we are using to
2 ensure that we have the proper inventory, put that in
3 FSAR. And also please specify the industry standards
4 that we are using for the buried fuel oil piping.

5 And there are no confirmatory items on
6 this chapter.

7 And that is it for Chapter 9 for us.

8 CHAIR CORRADINI: Thank you. So thank
9 you.

10 At this point, why don't we take a break?

11 Is that all right?

12 MEMBER ABDEL-KHALIK: Will you get back
13 to us on the Fire Brigade issue?

14 MR. EUDY: Yes, we are going to get back
15 to you.

16 CHAIR CORRADINI: Somebody is coming
17 back? Okay.

18 MEMBER ABDEL-KHALIK: On the zinc
19 systems?

20 MR. WACHOWIAK: I guess in the RTNSS
21 discussion also, I left out the functional difference
22 between B and C for the reason why it is in the
23 program. But the main difference in those two
24 vendors that anything in B is required to be
25 functional following a seismic event, where things in

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1 C are not required to be functional following seismic
2 event.

3 CHAIR CORRADINI: And that is based on
4 probabilistic arguments?

5 MR. WACHOWIAK: The C --

6 CHAIR CORRADINI: I'm trying to
7 understand C because you said C is the category.

8 MR. WACHOWIAK: -- because of
9 probabilistic, we did a seismic margins analysis and
10 did not include any of those systems in the seismic
11 margins analysis. So there was no delta to calculate
12 there.

13 CHAIR CORRADINI: Oh.

14 MR. WACHOWIAK: Okay? For B, though, it
15 is the equipment that is required to be used after 72
16 hours. Okay? So, 72 hours following a seismic
17 event, you need to be able to use this equipment.
18 And in our minds, the only way that you can have
19 reasonable assurance that it will be available 72
20 hours after a seismic event is to design it to
21 withstand a seismic event.

22 CHAIR CORRADINI: Right. Thank you.

23 MR. WACHOWIAK: They count on repair in
24 that time frame.

25 CHAIR CORRADINI: So we will take a break

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1 until ten of.

2 (Whereupon, the foregoing meeting went off the record
3 at 2:34 p.m. and resumed at 2:53 p.m.)

4 CHAIR CORRADINI: Okay, lets get back
5 together.

6 MS. BORSH: For the question on fire
7 brigade and is it a unit specific or a site fire
8 brigade, it is in Rev 1 of our FSAR. We do explain
9 that it is a fire brigade for Unit 3, which is
10 completely separate from Units 1 and 2 personnel fire
11 brigade. Okay?

12 CHAIR CORRADINI: Thank you.

13 MS. BORSH: You're welcome.

14 MR. EUDY: Okay, the staff will take over
15 the discussion. We appreciate Dominion's
16 presentation and we agree that it is an accurate
17 representation of the content of their FSAR Chapter
18 9. Here is the technical staff involved.

19 And what we have decided to do, there is
20 quite a bit of information in Chapter 9. We have
21 focused on a few issues that we want to about that we
22 feel are technically interesting.

23 9.2.1, Plant Service Water, which we will
24 have an extensive discussion on, 9.3.2, 9.3.9, and
25 9.3.10. We will go into fire protection. I believe

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1 we had our questions answered regarding the zinc
2 injection system. And 9.5.2 and 9.5.4.

3 So right now, I will turn it over to
4 Larry Wheeler to begin the technical discussion. And
5 one thing I will point out is for 9.5.1, we actually
6 had six open items. Even though we finished our SER
7 about one to two months ago, we still are interactive
8 with Dominion and we got some responses to those.
9 And now a few of them are confirmatory. So the staff
10 is actively engaged in continuing to work with
11 Dominion.

12 MR. WHEELER: Okay, thank you. The staff
13 focused on the North Anna conceptual design
14 information, the COL, the supplemental information
15 for the Plant Service Water System. As a quick
16 overview and as Dominion had stated, there are six
17 remaining plant service water open items. We are
18 going to call these items number 8 through number 13.

19 Items 10 and 12, the staff had a phone
20 call with Dominion on July 16th and they read their
21 draft responses. The staff still has to review but
22 this appears to be favorable to close out to
23 confirmatory items once the RAIs are received.

24 Item 13 remains open. Items 8, 9, and 11
25 staff review is ongoing from the North Anna RAI

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1 responses dated July 8th and these will become
2 confirmatory items.

3 Open item number 10, program controls
4 need to be addressed to monitor the condition
5 performance of the plant service water system over
6 time to maintain availability, the reliability of the
7 system. We had a phone call on July 16th with
8 Dominion. They proposed a response. It looks
9 favorable that the Plant Service Water System is in
10 the Maintenance Rule. It will be treated as high
11 safety significant.

12 The second part of the item number 10,
13 chemical control system for the basin of the
14 Auxiliary Heat Sink cooling tower needs to be
15 addressed due to Industry OE for the Service Water
16 System. Concerns were long-term corrosion and
17 fouling of the plant service water system. For
18 examples, Generic Letter 89-13 and IEB 81-03.

19 At the phone call on July 16th, Dominion
20 proposed a response that looks favorable. Will
21 provide the FSAR updates to add the chemical control
22 system.

23 CHAIR CORRADINI: So, can I just make
24 sure I understand what you mean by that? So you guys
25 have had conversations and so there is some

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1 recommendations that you find favorable? The way you
2 said it sounded the reverse of that. That's why I
3 didn't understand it.

4 MR. WHEELER: We had the phone call.
5 Then -- first of all, they have an RAI.

6 CHAIR CORRADINI: Right.

7 MR. WHEELER: And they did not give us a
8 written response. They had a phone call ASME. They
9 read word-for-word what their RAI response was going
10 to be.

11 CHAIR CORRADINI: Ah.

12 MR. WHEELER: And based on the staff's
13 initial review of what they said, it looks favorable
14 but we can't really say --

15 CHAIR CORRADINI: Okay.

16 MR. WHEELER: -- for sure that it is
17 approved until we get the RAI in and review that
18 response.

19 CHAIR CORRADINI: Okay.

20 MR. WHEELER: That is for two items.

21 CHAIR CORRADINI: All right. I
22 understand now. Thank you.

23 MR. WHEELER: That also applies for item
24 number 12.

25 Item number 12, the cooling tower

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1 performance, fan functions, heat dissipation needs to
2 be addressed. We had the phone call on July 16th.
3 Dominion proposed response looked favorable. The
4 cooling tower performance will be expanded. For
5 example, controls, interlock spans and heat transfer.

6 Second part to item number 12, testing of
7 design features which minimize a system water hammer
8 needs to be addressed. The same phone call on July
9 16th. The Dominion proposed response looks
10 favorable.

11 CONSULTANT WALLIS: Well, minimizing it
12 isn't good enough. You have got to make it go away.

13 Minimize makes it as small as you can. It could
14 still be intolerable.

15 MR. WHEELER: Well --

16 CONSULTANT WALLIS: This word minimize is
17 used in a very strange way.

18 MR. WHEELER: There are design features
19 that are in the DCD that says that they had these
20 features that are going to minimize --

21 CONSULTANT WALLIS: But you want to
22 prevent. You don't want to minimize. You can
23 minimize something and it can still be of intolerable
24 magnitude.

25 MR. WHEELER: That will be -- Chang Li

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1 needs to answer that. Because that is what they put
2 in their DCD, that they have design features that are
3 going to minimize water hammer.

4 CONSULTANT WALLIS: It doesn't mean
5 anything.

6 MR. SEGALA: I think from the staff's
7 perspective, you know, we look at the design of the
8 system and we look at design features that minimize
9 the potential for water hammer. And then we also
10 look for operating procedures. We look for initial
11 startup testing to test for that. And we put all of
12 these together to give us reasonable assurance that
13 they will minimize the potential of water hammer. I
14 don't think you could ever completely eliminate it
15 but you can do things that will greatly minimize its
16 occurrence.

17 CONSULTANT WALLIS: It doesn't make any
18 sense. I mean, I can minimize my weight by not
19 eating. But I still may be overweight for some
20 purposes. Minimize doesn't mean anything unless you
21 match some criterion.

22 I just object to this very loose use of
23 this word in a meaningless sense. How do they make
24 water hammer go away to a satisfactory enough degree?

25 CHAIR CORRADINI: With all due respect,

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1 you kind of just used the word minimized with four
2 words instead of one. You said make it go away to
3 some degree. So that is almost like reducing it --

4 CONSULTANT WALLIS: Well there has to be
5 some acceptable criteria.

6 CHAIR CORRADINI: Okay.

7 MR. WHEELER: Well, for example, there
8 are auto air vent valves that are part of the DCD.
9 Those are design features to mitigate --

10 CONSULTANT WALLIS: And reduce the
11 probability of water hammer.

12 MR. WHEELER: Right. The other things
13 they use is valve closures. If a valve closes too
14 fast, there could be a concern with water hammer. If
15 check valves leak, there could be a potential for a
16 water hammer. If the system drains down and buoys
17 and you get an auto-start on the system, then you
18 could have a water hammer.

19 So a lot of design features that are out
20 there as part of the DCD all go hand-in-hand. And
21 the reason we asked this open item is we understand
22 there are design features out there. Well, let's
23 make sure that you test them.

24 CONSULTANT WALLIS: That's okay. I
25 object. Don't use the word minimize.

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1 MR. WHEELER: So the Dominion proposed
2 response looks favorable. They will be testing
3 design features such as auto-air vent valves and
4 valves for proper closure timing.

5 Open item number 13, operating
6 experiences with fiberglass piping, clarifications of
7 codes and standards, address special QA requirements.
8 This all needs to be addressed.

9 Based on the phone call of July 16th with
10 Dominion, they need a little bit more additional time
11 in order to adequately address that RAI.

12 MEMBER ABDEL-KHALIK: How does an auto-
13 air vent valve work?

14 MR. WHEELER: I don't know that answer.
15 Maybe somebody from GEH staff could answer that.

16 MS. BORSH: Mike Arcaro are you on the
17 line still?

18 MR. ARCARO: Yes, I am on the line. I
19 guess the ones that I am familiar with are air
20 release valves. What they do is they are sitting in
21 the high point of systems. They remove the air from
22 piping system so that you don't end up with water
23 hammer, where you are trying to compress air rather
24 than water. So it keeps, it flows the air out to
25 keep the pipe full.

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1 MEMBER ABDEL-KHALIK: The focus of my
2 question is on the word "auto." How does that kind
3 of valve work automatically?

4 MR. ARCARO: It is a float. It senses
5 either air or water and lets the air through and it
6 stops the water.

7 MEMBER ABDEL-KHALIK: So it is a
8 continuous venting valve. Is that what it is?

9 MR. ARCARO: If you have, you know, lots
10 of air in the system, it would vent the air. But
11 normally, the piping is full of water. You don't
12 have air. You build it so that you don't develop
13 air. During maintenance and bringing systems online,
14 you vent them. So, it would continuously remove air
15 that was present but, you know, we would always be
16 venting.

17 MEMBER ABDEL-KHALIK: Okay, thank you.

18 MR. WHEELER: Okay, now back to the
19 fiberglass issues. We are still waiting for Dominion
20 to respond to that RAI.

21 Gina, do you have an ETA on that
22 response, just so I can make a memo?

23 MS. BORSH: Yes, August 4th.

24 MR. WHEELER: August 4th. Thank you.

25 MS. BORSH: You're welcome.

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1 MR. WHEELER: Next slide. Open item
2 number 8, Dominion letter dated July 8th provided an
3 FSAR markup to section 2.4.2, an ITAAC to address
4 Tier I and DCD interface requirements. This is still
5 being reviewed by the staff and looks favorable that
6 this item can be closed to a confirmatory item, since
7 the ITAAC was revised.

8 Open item number 9, to addressed the COL
9 item, Dominion's letter dated July 8th provided an
10 FSAR markup. As stated that the carbon steel will
11 meet ASTM standards that will be used above ground.
12 This is a review by the staff. It looks favorable
13 this item can be closed to a confirmatory item.

14 Item number 11, this is an administrative
15 issue and not technical. Dominion letter dated July
16 8th provided an FSAR markup correcting the text.
17 This is the CDI versus the DCD information that was
18 in the North Anna application. This is still being
19 reviewed by the staff. This looks favorable. This
20 item can be closed to a confirmatory item.

21 And this concludes my discussion on
22 9.2.1.

23 MR. SASTRE: 9.3.2 called Process
24 Sampling System and Post-Accident Sampling Program.
25 And there was on COL item where the applicant had to

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1 provide and develop a Post-Accident Sampling Program.

2 This program, as the applicant stated in their
3 presentation, consists of emergency operating
4 procedures that rely on self post-accident
5 evaluation, monitoring and instrumentation, plant
6 procedure for obtaining highly priority grab samples,
7 a containment monitoring system, and capable of
8 operation for fuel pool-cooling mode and effluent
9 radiation monitoring.

10 The post-accident monitoring, we're to
11 implement the emergency plan with our reliance on
12 post-accident sampling capabilities, we find that the
13 absence of a dedicated post-accident sampling system
14 does not affect the effectiveness of the emergency
15 plan.

16 For this reason, the staff finds the COL,
17 that item, was adequately addressed.

18 CHAIR CORRADINI: So just to make sure I
19 understand, the difference between this program and a
20 system, the program would have people going out and
21 making measurements, taking samples. The system is
22 more of an automated system? I am trying to
23 understand.

24 MR. SASTRE: No. The system will be more
25 based on samples.

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1 CHAIR CORRADINI: Right.

2 MR. SASTRE: The program will be more
3 based on procedures where they can monitor, they can
4 see. They can check the monitors. And in case of,
5 you make a sample.

6 CHAIR CORRADINI: So, they would be doing
7 manual sampling, based on some sort of protocol.

8 MR. SASTRE: Exactly.

9 CHAIR CORRADINI: Okay, thank you.

10 MR. SASTRE: And that was in SECY-93-087
11 the commission exempted evolutionary and passive
12 plans from the system.

13 CHAIR CORRADINI: Thank you.

14 MR. SASTRE: Hydrogen Water Chemistry
15 System. And the Hydrogen Water Chemistry System is a
16 nonsafety-related system and it is optional. And the
17 ESBWR standard plant design includes an option to
18 install the Hydrogen Water Chemistry System.

19 In the COL, the applicant decided to
20 implement the Hydrogen Water Chemistry System as
21 stated and they will follow the guidelines from EPRI
22 Report 4947, which were approved by NRC.

23 In the second COL item, which was the COL
24 applicant had to provide hydrogen storage and supply
25 facility requirements and an appropriate supply

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1 system, the applicant provided a detail of where the
2 storage facility was going to be located. And they
3 said that it was going to be located within the plant
4 area but outside of plant protected area, far away
5 from any safety-related equipment because of safety
6 reasons for explosion of the hydrogen. And they were
7 going to follow the EPRI Report 5283, which was also
8 approved by NRC. And for those reasons, the NRC
9 staff finds that acceptable.

10 In the Oxygen Injection System, they have
11 another COL item also for specifying where the
12 storage facility was going to be located. And they
13 are going to follow the same guidance that for the
14 hydrogen storage facility at EPRI Report 5283. And
15 for that reason, the staff finds it acceptable.

16 MR. EUDY: Okay, we are going to jump to
17 Section 9.5.2 to limit some of the shuffling. And we
18 have Gene Eagle here to discuss slide 17, Section
19 9.5.2, which is Communications Systems.

20 MR. EAGLE: This area is basically our
21 Emergency Communications Systems that are used to
22 support the various actions in kind of emergency type
23 area and also supports the regular normal operations
24 of the plant.

25 The first slide here gives a general

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1 boiler plate. The main thing is that there were five
2 COLA information items which are covered on the next
3 page. The key here is of course the emergency
4 notification to the NRC is the number one thing and
5 then the state and local and county jurisdictions and
6 surrounding operation centers. And it is covered by
7 this Emergency Notification System that we already
8 talked a little moment ago about the Insta-Phone
9 System, where you pick it up and it automatically
10 starts the dialing for you. You don't have to sit
11 there and pick out phone numbers or something like
12 that.

13 In addition this is backed up. One of
14 the key things that is backing this up in Bulletin
15 80-15, is that this system has to stay up. If you
16 lose your offsite power or if you lose the ACC power,
17 it has to have battery backup or a reliable backup
18 system, inverters, that type of thing, which we found
19 it did have and was acceptable.

20 Also, they were asked to provide, tell
21 how they were going to do their links with the grid,
22 the grid operator. Dominion has an entire system
23 that uses fiber optics that connects all of their key
24 systems to the operator. That is to the dispatcher,
25 effectively.

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1 Another one of the COLA items was the
2 offsite notifications. This one basically covers the
3 jurisdictions that are affected like the Commonwealth
4 of Virginia, the counties that are involved, the
5 emergency centers. They went through and described
6 these. And one of the key things that these things
7 have not only the main telephone system which are
8 dedicated to it, but also they have backups. They
9 can go back to having a complete commercial
10 operation, a commercial telephone system that can
11 also be used if the main system fails and you still
12 have some radio backup. Again you have the battery
13 backups in case the main system fails, the ACC fails.

14 The second type of offsite interfaces is
15 we are dealing with the NRC. And this is a complex
16 set of telephone systems, private lines that are
17 dedicated to help out. You have, for instance, the
18 management computer data part link. This would allow
19 the NRC managers and their staff to interact and talk
20 to each other as well as talk to the management of
21 the plant.

22 Of course, you have a health physics type
23 network for the health physics people, the NRC's
24 health physics people and their advisories can talk.
25 You have local area networks. And also one of the

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1 most important things is the Emergency Response Data
2 System that would then, depending on usually it is
3 depending on what level emergency it is, if it is an
4 unusual event, it may start there. But almost
5 anything higher than that, an alert of higher, they
6 have the ability to go ahead and hit, a lot of times,
7 it would be hit the button and let the operators
8 start this system would be anticipated here. It has
9 the ability to start transmitting a certain amount of
10 key data to the NRC, depending on the type of
11 emergency that you want to deal with.

12 But these again, we also have the fire
13 brigade. We did a little speaking about that. They
14 use a Fire Brigade Radio System. They have an
15 emergency radio type system with several channels.
16 One channel is dedicated to be used mainly for the
17 fire brigade. And then it has it so they can
18 actually link to the individual units. They have
19 aerials throughout the plant and that they could then
20 -- but also you have the ability, you can actually
21 use this as a backup to some of your other emergency
22 type systems in making communications.

23 You also can link up with ambulances,
24 both to emergency medical facilities, their telephone
25 and also radio to the actual ambulance themselves.

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1 This kind of gives us kind of an overall
2 big picture of the various communication systems that
3 are available. One that is not discussed here is the
4 security system, the security guards, and the
5 safeguards type of system is covered more by the
6 Section 13.6. And further details about this also
7 covered in the emergency plan, which will be covered
8 when we go to Chapter 13.3. And that basically
9 summarizes the system, and we found it acceptable in
10 answering the COLA information items.

11 MR. EUDY: Any questions on this section?

12 Okay, I will call up Ed McCann and Bob
13 Radlinski to finish out this chapter. And we are
14 going to go back to slide 12; 9.5.1, Fire Protection
15 System.

16 MR. McCANN: My name is Ed McCann. And I
17 was responding to the North Anna SCR.

18 This first slide is just basically
19 talking of the high level or what we actually used
20 to review the SCR, to write the SCR to review the
21 COLA.

22 And the most high level on is GDC3 and
23 50.48 this just tells you with the regulation what
24 you need to do for Appendix R. And the main one in
25 this list is Regulatory Guide 1.189.

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1 And the SECYs, they would be criteria for
2 enhanced fire protection. Next slide.

3 There is two main enhanced fire
4 protection type criteria. And one is you want to
5 ensure that for any one fire area, that this fire
6 will render the equipment inoperable and you cannot
7 do a re-entry. In other words, you can't have any
8 possible mitigation in that fire area, where the fire
9 is.

10 And also the next item is the smoke, hot
11 gasses. The fire suppression will not migrate into
12 other areas and cause a problem in terms of safe
13 shutdown.

14 But these are issues from old plants that
15 in the SECYs they decided to put in there as enhanced
16 fire protection. Next slide.

17 The main thing we used was Regulatory
18 Guide 1.189 and it contains extensive guidance that
19 is also used for the new reactors. And Bob and
20 myself, when we did the revision for new reactors, so
21 we didn't know quite details about that regulatory
22 guide.

23 And the review that we did focuses on the
24 site-specific and the DCD interfacing fire protection
25 program attributes. At the same time, in order to do

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1 a total review, you are going to have to look at the
2 DCD and look at its design. So, any incorporated by
3 references that you have, you do need to validate the
4 whole system to make sense.

5 And then also since fire protection goes
6 across all kinds of, all lines, you are looking at
7 you are reading Chapter 7, Chapter 8, 13. So, it is
8 a large chunk of information you have to review.

9 And so we reviewed that again, with
10 mostly Regulatory Guide 1.189, which is a pretty
11 thick document. And it is, like I said, very
12 extensive. And so we go through this. And when you
13 look at secondary water sources, fire barriers, smoke
14 control, fire pumps, fire protection water supply
15 systems, QA, fire brigade, communication, and
16 emergency lighting. And you can really do a pretty
17 good review based on this regulatory guide because it
18 is very exacting.

19 And there is a few other items. The main
20 control room is based on fire hazards and also fire
21 prevention procedures. Here, as you know, all trains
22 essentially go through the control room. So, you
23 have shut down at the RSS.

24 And possible spurious actuations in
25 accordance with staff expectations.

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1 MEMBER ABDEL-KHALIK: Could you explain
2 what that means?

3 MR. McCANN: Okay. All right. It turns
4 out it is a DCD item but what essentially I got
5 involved with the ESBWR also. And in there, they
6 have design features in Section 9.5.1.10, design
7 features that prevent or mitigate spurious
8 actuations. And they go through various types of
9 systems.

10 And some of these systems, you are going
11 to have a digital system and you will have a fiber
12 active cable and you have complicated numbering
13 systems. And you don't get shorts with fiber optic
14 cables. And it is essentially very difficult, near
15 impossible to get hot shorts with this kind.

16 And they go through some of the other
17 systems but the main item I had to have them add is
18 that you need to use a deterministic approach. So
19 essentially, if this room here is on fire and if
20 there is a cable that has a power conductor in it,
21 and you have a cable that you are concerned about, if
22 it is in the room, you need to consider it for
23 spurious actuation. And that is what they are going
24 to do.

25 MEMBER ABDEL-KHALIK: How about spurious

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1 alarms rather than spurious actuations?

2 MR. McCANN: Well spurious alarms, I
3 don't think they are comparable. But if it -- I
4 actually don't know what they are going to do as far
5 as alarms. But in terms of procedures, if you have a
6 fire and it takes out your alarms, but they probably
7 will if it takes out your system. Also you can't
8 rely on the indications. So you are going to have to
9 rely on what the system performance parameters are,
10 other types of indications, if the systems are
11 operating or not, the valves are opened or closed or
12 not. That is what you normally do.

13 MEMBER ABDEL-KHALIK: Well, what is your
14 experience at Units 1 and 2 in terms of spurious
15 alarms in the control room for the fire protection
16 system?

17 MS. BORSH: I don't know if we have
18 anyone here that can answer that question.

19 MR. RADLINSKI: Are you referring to
20 spurious alarms calling about a fire?

21 MEMBER ABDEL-KHALIK: No. Just spurious
22 alarms because of they are spurious.

23 (Laughter.)

24 MS. BORSH: Would you like me to get back
25 with you on that?

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1 MEMBER ABDEL-KHALIK: Well, I am trying
2 to understand the meaning of this bullet that is
3 "multiple spurious in accordance with staff
4 expectations." You are talking about spurious
5 actuations.

6 MR. McCANN: Yes.

7 MEMBER ABDEL-KHALIK: And I am also
8 concerned about spurious alarms because those may, if
9 they happen frequently enough, the operators will
10 just ignore them.

11 MR. McCANN: Well that is different. You
12 know, frequently is a different issue. That is not
13 fire. Fire is not frequent. I mean --

14 MEMBER ABDEL-KHALIK: No, if the spurious
15 alarms happen frequently enough, the operators will
16 ignore them even if it was a real fire.

17 MR. McCANN: That is a separate issue
18 completely. That has nothing to do with 9.5.1 Fire
19 Protection. That has to do with design of the plant.

20 I mean if you have a design were you
21 continually get spurious actuation --

22 MEMBER ABDEL-KHALIK: Well, the fire
23 alarm system or the fire protection system --

24 MR. McCANN: Okay. You are talking about
25 -- okay, you are not talking about --

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1 MEMBER ABDEL-KHALIK: -- is not a part of
2 the fire --

3 MR. McCANN: Oh, I see. You are not
4 talking about system alarms going off. You know, in
5 other words, the valve is open when it is really
6 closed. You are talking about the fire alarm
7 systems.

8 MEMBER ABDEL-KHALIK: Yes, sir.

9 MR. McCANN: Oh, okay.

10 MR. RADLINSKI: Well, they would have to
11 be responded to by the fire brigade.

12 MR. McCANN: Right.

13 MR. RADLINSKI: They can't ignore those.
14 If they are getting spurious or frequent spurious
15 fire alarms, then they need to make some changes to
16 the system.

17 If they have really sensitive -- say
18 smoke detectors are really sensitive and say --

19 MEMBER ABDEL-KHALIK: What is the
20 operational experience with spurious alarms in the
21 control room, as far as the fire detection system?

22 MR. RADLINSKI: We don't have any data on
23 that.

24 MR. EUDY: I wonder if our human factors
25 people could answer that one.

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1 Is your question is there a difference
2 between a fire alarm going off or is it something
3 else?

4 MEMBER ABDEL-KHALIK: Well --

5 MR. EUDY: They will know that it is a
6 fire alarm.

7 MEMBER ABDEL-KHALIK: My concern is that
8 the focus on spurious actuation of the system. I am
9 also concerned about --

10 MR. RADLINSKI: Well, these are spurious
11 actuations that could prevent safe shutdown. Giving
12 false indication to the fire brigade that they may
13 have a fire that is outside the realm of this post-
14 fire safe shutdown circuit analysis, while you were
15 considering the potential for spurious actuations.

16 The reason we bring this up is because
17 with the current plants, okay, for years there was a
18 conflict between the industry and the NRC about
19 whether or not it was credible to have multiple
20 spurious actuations and even a fire. Okay? So, the
21 issue has been raised. We dealt with it for the past
22 five years, at least. And we believe we have come to
23 a resolution. NEI has prepared a guidance document
24 for doing analyses and provide guidance for how to
25 address spurious actuations.

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1 So, we want to make sure that we don't
2 have to go through the same thing with the new
3 reactors. And all the designs, all the reactor
4 designers have committed to doing post-fire safety
5 circuit analysis and not just assuming that the fire
6 disabled everything in that fire area. They have to
7 look at what potential spurious actuations could be
8 caused by the fire.

9 MEMBER ABDEL-KHALIK: I understand. My
10 question pertains to the fire detection system and
11 whether or not that is a part of your review process.

12 MR. RADLINSKI: It is not.

13 MEMBER ABDEL-KHALIK: It is not.

14 MR. RADLINSKI: Because it is not
15 important to safety in the same sense that the
16 ability to shut the plant and you are going to have a
17 fire. It is something that has to be dealt with on
18 an administrative basis.

19 If you are getting frequent fire alarms
20 and they are spurious and they are false alarms, that
21 is --

22 MEMBER ABDEL-KHALIK: So the fire
23 detection system is not described anywhere and is not
24 subject to review?

25 MR. RADLINSKI: But don't forget, the

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1 fire detection system is not required for safe
2 shutdown. The performance of that system, it is just
3 part of the defense-in-depth. Okay? It may or may
4 not give you an indication of a fire. Okay? And it
5 is one level of defense-in-depth the detection of a
6 fire.

7 The other is the extinguishment of the
8 fire. And the most important one is that in the
9 event of you don't get a detection, you don't get
10 suppression of the fire, you can still shut down the
11 plant because you have a passive barrier that
12 separates your redundant train.

13 MEMBER ABDEL-KHALIK: So you don't think
14 if you have a funky fire detection system that alarms
15 sort of spuriously on a regular basis is a safety
16 hazard?

17 MR. McCANN: Oh, we don't get into the
18 details of design. We will say for this fire hazard,
19 it would be this type of detection is required or
20 trays, certain trays you want certain protection,
21 certain types of detection and suppression for that
22 matter.

23 But we don't get into the exact details
24 that we are going to assume that they have come up
25 with a faulty design.

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1 MR. RADLINSKI: But you are right. I
2 mean, it could be a safety concern if they start to
3 ignore the signals because they occur often and they
4 are false alarms. But that is an administrative
5 problem that needs to be dealt with from an
6 operational standpoint. It is not a design problem
7 in terms of us being comfortable with the fact that
8 they can safely shut the plant down in the event of a
9 fire, which is more our focus.

10 MEMBER ABDEL-KHALIK: We will try to
11 pursue this in some other fashion.

12 MR. RADLINSKI: It is a good question but
13 it is just not something -- it is outside the realm
14 of what we normally --

15 MEMBER ABDEL-KHALIK: Well, at least we
16 ought to be cognizant of the potential impact of such
17 a problem and what the operating experience is.

18 MR. RADLINSKI: Like I said, I don't have
19 any data on that. So, there may be some available.
20 I'm not sure it is something that they report, that
21 the operators are required to report. I mean --

22 MS. BORSH: Well, under our corrective
23 action system, any kind of a spurious actuation would
24 be reported. And of course, you know, they have
25 operator logs that they are tracking, too, for alarms

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1 that are coming in whether they are spurious or not.

2 But if there is a problem with any piece of
3 equipment for any reason, it would be processed in
4 our Corrective Action System and appropriate
5 corrective action would be taken.

6 MEMBER ABDEL-KHALIK: Is there anything
7 unique about the fire detection system for the ESBWR
8 versus whatever you currently have in Units 1 and 2?

9 MR. WACHOWIAK: It will be connected to a
10 digital I and C system.

11 MR. ANDRUKAT: This is Dennis Andrukak.
12 I work with Bob Radlinski and Ed McCann, NRC.

13 The fire alarm system, I just want to
14 clarify a couple of things real quick. Spurious
15 alarm can be confused with a spurious actuation.
16 They are completely different things. So what we are
17 going to call it, which I think you are talking about
18 is a nuisance alarm.

19 MEMBER ABDEL-KHALIK: Okay.

20 MR. ANDRUKAT: Okay. So we have a
21 nuisance alarm. All of our systems and how they
22 describe are going to be built and designed as
23 committed in accordance with our code NFPA 72.

24 Now in that code, there are two things
25 that might help you out. One is that every piece of

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1 equipment is UL listed and built for the system and
2 should not cause any nuisance alarms as designed per
3 the code. And if it does, it is incorrectly
4 designed. So, our commitment and their commitment to
5 follow this code should prevent this up front.

6 If they later produce nuisance alarms,
7 the other thing in the code are maintenance tests and
8 inspection schedules. And part of that is you test
9 the system if you find anything wrong with it. And
10 they are supposed to be doing this on a weekly,
11 quarterly, annual type of basis to pick up some of
12 these false alarms, false readings. And they will
13 actually go out and actually test every single
14 detector, at least on an annual basis.

15 I don't know if that helps clarify a lot
16 of stuff for you.

17 MEMBER ABDEL-KHALIK: Yes, thank you.
18 That is very helpful.

19 MR. WACHOWIAK: The other thing that I
20 would point out in this is every time, at least in
21 the plants that I am used to working at, every time
22 you would have a fire alarm, a corrective action
23 notification would be written and it would, if it is
24 one by itself, probably wouldn't be investigated.
25 But if you get a string of those, the trend code

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1 should pick that up and get in to do a root cause
2 analysis and correct it under the PI and R, whatever
3 Problem Identification and Resolution Program. So I
4 think that is where the nuisance alarm would be
5 picked up that you are talking about.

6 MR. McCANN: I think also for the NRC
7 side of things, if you have enough inspections and we
8 have noticed that these issues throughout the plants
9 and the operating experience would show you have an
10 issue. And then it would come to NRR. They would
11 investigate it and possibly generate an information
12 notice or a generic letter, depending upon what the
13 issue is.

14 MEMBER ABDEL-KHALIK: Thank you.

15 MR. McCANN: Okay, and then the next one
16 is smoke effects, which shows up in the next slide.
17 We will get to that in a second.

18 Then there is approximately 20 RAIs were
19 written and resolved. And they all resolved. And
20 actually we had 18 for 9.5.1 and the one Chapter 13
21 one related to organization, so we look at 13 also.
22 And one was deleted.

23 A fire brigade, we met the guidance and
24 it is mainly in the DCD. The information is in the
25 DCD, most of it. So the guidance in Reg Guide 1.189

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1 was met and the clarification that you heard before
2 about the Unit 3 fire brigade is not in Units 1 and
3 2.

4 And the smoke control, they use smoke
5 dampers, combination of fire barriers, manual smoke
6 control procedures and automatic sprinklers, where
7 applicable. So, if you have a fire that could be
8 smoky, they could put in automatic sprinklers where
9 applicable but not everywhere. So, that is how they
10 try to limit smoke.

11 Okay, then we do a fire hazards analysis.

12 And the applicant has committed to do an as-built
13 type of a compliance review to ensure, as you know,
14 you have a design and it never works out perfect.
15 So, they are going to do this compliance review of
16 the as-built.

17 MR. RADLINSKI: This is Bob Radlinski.
18 They have also in DCD, you are probably aware, they
19 have done a very detailed fire hazard analysis, based
20 on the design as it stands right now.

21 So this final fire hazard analysis is
22 primarily to make sure that the as-built as purchased
23 plant is in accordance with the findings of that
24 original fire hazard analysis with DCD.

25 MR. McCANN: Right. And at GEH, they

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1 also did their site-specific FHA also.

2 And so, next slide, in conclusion, we
3 find them in accordance with the GDCs, the SECYs,
4 etcetera.

5 CONSULTANT KRESS: Fire Hazards Analysis
6 is sort of a qualitative probabilistic analysis,
7 where you look at high, medium and low possibilities
8 for certain fires.

9 MR. RADLINSKI: Qualitative, yes.

10 CONSULTANT KRESS: Okay.

11 MR. RADLINSKI: They do estimate the
12 level of combustible materials in each area, based on
13 the amount of cable insulation and anything else, any
14 loose ends, things like that, just to get a sense of
15 potential fire hazards.

16 CONSULTANT KRESS: Where the problems
17 might be. In other words, just for information.

18 Does the PRA have a -- did they use a
19 fire or did it have a fire analysis?

20 MR. WACHOWIAK: We did a fire PRA with
21 some bounding assumption. So no fire modeling to
22 limit the effect of the fire within a zone. We
23 didn't do any detect and suppress. And then there is
24 a few other simple applying assumptions that went in
25 but it wasn't part of PRA.

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1 MR. KEVERN: How does that relate to to
2 Fire Hazards Analysis?

3 MR. WACHOWIAK: We started with a Fire
4 Hazards Analysis zone definitions and used that as
5 major input to that fire PRA. So, it is --

6 MR. KEVERN: But they are related.

7 MR. WACHOWIAK: Yes, they are.

8 CHAIR CORRADINI: So I guess that -- I'm
9 glad Tom asked the question because I didn't know the
10 difference. So the Fire Hazard Analysis is, in some
11 sense, is a qualitative first cut at it. The fire
12 PRA then adds numbers to certain things with certain
13 simplified assumptions. But you don't do any
14 specific modeling, I mean, to because you said
15 something about some of the fire modeling that you
16 just assumed if it in certain rooms --

17 MR. WACHOWIAK: Right.

18 CHAIR CORRADINI: You just assumed
19 certain conditions. So you add quantitative numbers
20 to what to what the FHA is.

21 MR. WACHOWIAK: Yes, there are two sets
22 of requirements now for the new plant. You have to
23 do the FHA, which is a classical, some would say
24 deterministic fire methodology. And then we also
25 need to include as part of the comprehensive PRA a

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1 probabilistic evaluation of fire.

2 CHAIR CORRADINI: Within the whole PRA
3 scope.

4 MR. WACHOWIAK: Within the whole PRA
5 scope. And so the simplifying assumptions that we
6 did were associated with bounding things that are not
7 available until we have the detailed design.

8 CHAIR CORRADINI: Okay.

9 MR. WACHOWIAK: So it is hard to tell
10 where you have a fire source and a target, until you
11 have actually figured out what your fire source and
12 target are and what the materials are and what heat
13 load and all the rest of that kind of stuff.

14 So what we have done is, in searching for
15 design insights for fire purposes, we have assumed
16 that they are worst case fires, if they happen. And
17 we also have included in the fire PRA the assessment
18 of spurious operations. It is not the deterministic
19 that you are talking about but if there is a power
20 cable in the room, you assume that it actuates
21 something. But we will look at the design or have
22 looked at the design and specified some requirements
23 on the design of these systems to prevent minimized -
24 - no to prevent spurious operation --

25 CHAIR CORRADINI: You are just checking

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1 to see if everything is okay. Good move.

2 MR. WACHOWIAK: Yes. -- of our squibs
3 and solenoid valves that could open up the
4 containment or open up the relief valves or that
5 would cause isolation valve closure or opening when
6 we don't want that to happen.

7 So the process, we did as much as we
8 could in the PRA with the information that is
9 available to develop design insights. And the main
10 design insight is we design the system so that it is
11 not susceptible to hot shores.

12 MR. McCANN: I will say one thing. The
13 fire modeling and FHA are two completely different
14 things.

15 CHAIR CORRADINI: No, that I got. You
16 made that clear. I was just trying to figure out it
17 is in some sense, this is a progression of detail.
18 As you know more of the detail design, you can do
19 more detailed analysis.

20 MR. McCANN: Well now it is just two
21 different requirements.

22 MR. RADLINSKI: They did not use the fire
23 PRA to justify any deviations from our acceptance
24 criteria.

25 CHAIR CORRADINI: I understand.

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1 CONSULTANT KRESS: But do you do a
2 separate FHA for shutdown conditions or is it just
3 for operating conditions?

4 MR. RADLINSKI: Safe shutdown? You mean
5 Fire Hazard Analysis?

6 CONSULTANT KRESS: You say during
7 shutdown --

8 CHAIR CORRADINI: During shutdown.

9 CONSULTANT KRESS: It seems to me you are
10 more vulnerable to fires during that period.

11 MR. RADLINSKI: Fire PRA, I believe.

12 CONSULTANT KRESS: Fire PRA.

13 MR. WACHOWIAK: Fire PRA did that and
14 once again did generate an insight for the licensees
15 to -- they need to maintain their admin controls on
16 their fire doors during outages.

17 MR. McCANN: And then you have extra
18 transient-type loads.

19 MR. WACHOWIAK: Right.

20 MR. McCANN: You have to consider that.
21 That is part of the program, Fire Protection Program.

22 I'm done.

23 MR. RADLINSKI: Okay, I am Bob Radlinski
24 speaking on fire protection responsibilities. I am
25 helping out the balance of plant branch review of the

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1 diesel generator support systems. These are
2 sections 9.5.4 through 9.5.8. We have covered the
3 fuel oil, lube oil, the starting air, the cooling
4 water, and the intake as well as the subsystems that
5 support the operation of the diesel generator. In
6 short, the ESBWR, you have the standby diesel
7 generators and the ancillary diesel generators and
8 again stated they are not safety related. Which
9 means that the support systems are also nonsafety-
10 related.

11 For all of these sections, the North Anna
12 FSAR used an incorporated by reference the
13 information from the DCD. There are a couple of
14 exceptions. Well, one exception is 9.5.4 for the
15 fuel oil system, where there were a couple of COL
16 action items in the DCD. And North Anna has provided
17 the information, appropriate information in response
18 to those action items. They are listed here in this
19 first slide. We will talk about them a little bit
20 more later. Next slide.

21 Okay, the regulatory criteria again
22 provided that these are not safety-related diesel
23 generators. So we are using these criteria as they
24 apply with a great deal of flexibility. We are not
25 holding strictly to the same requirements that we

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1 would to a safety-related diesel generator and
2 support systems, which includes GDC 17. We looked at
3 the level of redundancy and independence and
4 testability of the support systems and the diesel
5 generators. Obviously, they had redundant power
6 supplies for these functions.

7 The SRP sections, they are numbers 9.5.4
8 through 9.5.8, there is a Reg Guide 1.137, the fuel
9 oil system. Again, that is for safety-related diesel
10 generators. And the SECY-94-084 and the Availability
11 Controls Manual guidelines apply to the RTNSS
12 aspects. So, the support systems, as are the diesel
13 generators, are RTNSS.

14 Okay, the two COL action items, one had
15 to do with establishing procedural controls to ensure
16 that the maintenance seven day of oil, fuel oil would
17 be maintained for both sets of diesels. There was an
18 RAI associated with this because they referred to
19 maintaining appropriate, you are using appropriate
20 margins to determine the seven day supply
21 requirement. And the RAI questioned that they used
22 the same terminology that is in the ANS/ANSI standard
23 which was a little more specific. And they have
24 agreed to do that, add that to the FSAR, informally
25 but we expect them to do that to resolve that issue.

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1 The other COL action item had to do with
2 the underground portion of the fuel oil transfer
3 piping. It is a direct varied pipe and they are
4 going to be coding that appropriately with an
5 impressed current cathodic protection on the outside,
6 increase wall thicknesses to account for intrusion on
7 the inside.

8 Their response, we had an RAI on this for
9 more information, their response included a couple of
10 standards. There is a non-mandatory appendix to
11 B31.1 Appendix 4 for corrosion protection and also an
12 API standard for the cathodic protection.

13 They mentioned these in the RAI response.

14 We had a follow-up RAI asking to actually specify
15 these standards, code standards, in the FSAR, which I
16 don't think they have responded to that I believe.

17 MS. BORSH: August 4th.

18 MR. RADLINSKI: So these are relatively
19 minor issues so we don't see a problem resolving them
20 satisfactorily. So, basically, we find it meets our
21 regulatory requirements and we find it acceptable.

22 CHAIR CORRADINI: Other questions by the
23 committee?

24 MEMBER ARMIJO: I am just curious on the
25 cathodic protection system. Now, you have a got a

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1 waterproof coating on the steel, on the carbon steel,
2 you can't have a circuit. So is the cathodic
3 protection to protect in the event that the
4 waterproof coating is flawed or damaged?

5 MR. RADLINSKI: Yes. It has got a belt
6 and suspenders.

7 MEMBER ARMIJO: Okay, that is all I
8 wanted to know.

9 CHAIR CORRADINI: Okay, other questions?

10 Okay, thank you very much. We are at the
11 end of the day, a bit early but at the end of the
12 day. I would like to go around and ask our
13 consultants and committee members to give me some
14 comments. We tomorrow are going to go over conduct
15 of operations and tech specs. Is that correct?

16 MS. BORSH: Correct.

17 CHAIR CORRADINI: So at least for the
18 first day, can I get some of your thoughts? Tom?

19 CONSULTANT KRESS: Yes, you can. Well,
20 in general, I believe the staff has the right
21 guidance, the appropriate guidance for doing things
22 like reviewing DCDs and COLAs and know what the
23 regulatory bases are. It seems apparent to me that
24 this is one of the things they generally do a good
25 job on.

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1 So, I don't believe this is any exception
2 and it looks to me like they have done a good job. I
3 could find very little I want to complain about,
4 which is, you know, a consultant's role is to
5 complain. And I think they are getting close to
6 having a COLA that can be approved and a DCD that can
7 be approved.

8 I was glad to see that the applicant
9 viewed some of the regulatory doses as a site
10 criteria, rather than just a plant criteria, because
11 that has been one of my things that bothers me about
12 lots of things.

13 CHAIR CORRADINI: Pet peeve?

14 CONSULTANT KRESS: Yes. Like the staff
15 knows, and the rest of the committee knows that is
16 one of my things.

17 I think somebody needs to look at the
18 probabilistic missile from generators. I don't know
19 who. Is Stetkar, he would be the man?

20 CHAIR CORRADINI: He is an interested
21 party.

22 CONSULTANT KRESS: Yes, okay. I think
23 they ought to look at that. It looks like a new type
24 of generator and I am not sure we are familiar with
25 it.

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1 And I was glad to hear from the staff
2 that if you have an IBR item that they would prefer
3 to resolve it at the DCD. I think that is the right
4 way to go. If you do it at the COLA level, you are
5 just going to have to do it again later. So, I am
6 glad you have the opportunity to look at the DCD and
7 the items like an IBR, you know where there is an
8 issue with the IBR.

9 I guess I am still somewhat bothered with
10 fiberglass-reinforced polyester pipe. I am not sure
11 exactly why but I think these lines, we must have
12 valves, and pipes, and Ts and joints. And these are
13 probably glued together. And I don't know how those
14 things, what the experience is with those. But I
15 don't have any experience myself or any particular
16 problem. It just seems to me, it just seems to
17 bother me intuitively. And I don't know if that is a
18 good reason to be bothered.

19 It looks to me like they have a good
20 handle on the hydrogen storage. And I first was
21 worried about hydrogen explosions but I think the way
22 that they are dealing with it in offset distance and
23 stuff is a good way to look at it.

24 I don't know much about zinc injection
25 and how well it handles a problem with cobalt. I

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1 guess I leave that to some of the materials guys. I
2 would prefer to get rid of the cobalt sources but
3 maybe you can't do that.

4 Anyway, that is my overall impression
5 that this is a good job by both the applicant and the
6 staff and it looks like they are on the right track.

7 CHAIR CORRADINI: Dr. Wallis.

8 CONSULTANT WALLIS: Well, I think I
9 agree, generally with Tom. I mean, we have asked
10 questions. I believe the staff and applicant have
11 been very responsive. I don't have any outstanding
12 problems.

13 I think sometimes we have to omit
14 quantitative answers. I encourage all participants
15 in these meetings to stay away from those rather
16 vague statements. Like saying what the criteria is
17 going to be evaluating it.

18 So but otherwise, you know, I think
19 things are on track.

20 CHAIR CORRADINI: Said?

21 MEMBER ABDEL-KHALIK: I have no added
22 comment.

23 MEMBER ARMIJO: Yes, I agree with Tom's
24 comments. I am just curious about these fiberglass-
25 reinforced polyethylene piping.

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1 CHAIR CORRADINI: So I am not the only
2 one.

3 MEMBER ARMIJO: You are not the only one.
4 You know, they are going to have joints. At some
5 point they have to join this material to steel
6 somewhere. And you have got above-ground stuff that
7 has got to be joined.

8 To me it is more of a curiosity. I am
9 sure you will resolve it but whenever you have a
10 report, I would like to just read whatever it is.

11 CONSULTANT WALLIS: Isn't it used for
12 domestic systems or something? There must be some
13 experience with it.

14 MEMBER ARMIJO: There is experience and
15 that is why I would like to read the report because I
16 am not familiar with all of that experience.

17 CHAIR CORRADINI: Well, I guess I was
18 going to ask the question about the power industry.
19 What is the experience in power plant technology of
20 the use of this over long periods of time? And is
21 there some sort of lessons learned? That is what I
22 guess I would be -- in a corrosive or in an
23 industrial environment where you bury it and you walk
24 away. Unless you are doing inspection of these, but
25 I don't think that is --

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1 MEMBER ARMIJO: Well, I think there is
2 some inspection criteria. In fact, NRC Research is
3 looking into doing some work on these materials, both
4 for inspectability and aging.

5 But I would be curious whatever Dominion
6 has provided to the staff, when they are finished
7 with it, I would like to read that report.

8 I think I would like to compliment
9 Dominion for implementing the hydrogen water
10 chemistry. I think that is the right water chemistry
11 for any BWR. And so I am glad that is -- you picked
12 up that option.

13 And I agree that a good decision made on
14 not implementing zinc. I think you don't have a big
15 research system to protect and inspect and maintain.

16 And a lot of effort has gone into the choice of
17 materials. So, I think that is on the right track.

18 So other than that, I think everything is
19 looking good.

20 CHAIR CORRADINI: I guess I had a
21 question for Dominion and GEH together. So, are you
22 -- I am still back to this service water system and
23 the RTNSS. This is something that I really don't
24 completely get.

25 Is it a matter of a conversation with

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1 staff until everybody is on the same page as to how
2 the level of specificity of the design that will
3 essentially be acceptable at the COL stage and
4 associated administrative controls, such as
5 inspections and testing and such? And because I hear
6 the staff saying that after the July 16th phone call,
7 they were feeling better. So then this, once
8 documented, this will essentially form a basis for
9 RTNSS C?

10 MR. HICKS: No, I don't think it is that
11 broad.

12 CHAIR CORRADINI: Okay. So, you have
13 done it with one but every one will be a discussion
14 as to the details of the design and the type of
15 administrative controls and procedures that will need
16 to be watched over?

17 MR. WACHOWIAK: I think in the DCD space,
18 we have had extensive conversation and an audit, an
19 audit report and a response to an audit report. And
20 my understanding of where we are now is that we have
21 resolved 95 percent of those issues.

22 And so it is a matter of closing out the
23 remaining five percent of things from the audit on
24 the DCD side, which essentially sets the bar for what
25 is the level of detail in which things need to have

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1 ITAAC.

2 CHAIR CORRADINI: But just for my, and
3 then I would welcome the staff's comments on this, so
4 I make sure I am not misunderstanding but in some
5 sense, you are doing this on a case-by-case basis
6 which builds up essentially a history of how you want
7 to do it for your various categories of C/B type of
8 RTNSS systems. Is that correct?

9 MR. WACHOWIAK: I don't know that I would
10 characterize it as a case-by-case basis. The audit
11 covered all of the systems --

12 CHAIR CORRADINI: Oh.

13 MR. WACHOWIAK: -- comprehensively.

14 CHAIR CORRADINI: Okay. I'm sorry.

15 MR. WACHOWIAK: And the RAIs that we
16 ended up getting were almost cookie-cutter system to
17 system, to system. So, it is being treated
18 comprehensively in the DCD, not on a case-by-case
19 basis.

20 CHAIR CORRADINI: Okay. Does the staff
21 want to say anything at this point?

22 MR. KEVERN: Sure. This is Tom Kevern.
23 I would like to make a comment just from a process-
24 related point of view there. Reinforcing what Rick
25 said, when we went through RTNSS, the discussion for

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1 a period of couple of years here, on the design
2 control document, and there may be different opinions
3 but I think we have reached kind of an agreement of
4 understanding of what this new process is. We are
5 all on a learning curve. Let me start over again on
6 that.

7 We are all on a learning curve on RTNSS.

8 So, we have reached a consensus on where we are,
9 what we expect and how the applicant is expected to
10 explain this.

11 Now, when we started in on the first COL
12 application in the plant-specific systems, a
13 combination of different reviewers, different
14 situation, less information being provided, we did, I
15 would say, a step back on the learning curve. So the
16 question is when we look at what was provided in
17 plant service water being the best example, it came
18 up short from the staff's expectations for a number
19 of reasons.

20 And from the applicant's point of view,
21 maybe they thought they provided enough detail.
22 Maybe not. I don't know. But in the process, when
23 we looked at it, we had RAIs that covered a spectrum
24 of issues there, degree of detail, of information,
25 the amount of what was clearly identified as whether

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1 there was CDI interface or plant-specific
2 information, then of course, the RTNSS availability
3 controls concern.

4 The first series of RAIs that went out on
5 that were pretty comprehensive. We looked at those
6 RAIs, the staff did, and decided to clarify some of
7 those somewhat. In the meantime, the applicant is
8 looking at those, providing us a response. So it was
9 an iterative process, hopefully just the first time,
10 as we are now on more of a common point on the
11 learning curve, both the applicant and the staff, as
12 far as what RTNSS means and what the expectations are
13 for level of detail as far as what is expected in the
14 availability controls associated with those systems.

15 That is a long answer. But an plant
16 service water is the classic example. We have not
17 seen this in others. I used the example that Bob did
18 on diesel generator fuel oil. That is also a RTNSS
19 system but it is small in comparison. And so it is
20 easier to get your arms around it and say we don't
21 recognize. We have the diesel generators that are
22 RTNSS. We went through that in electrical Chapter 8
23 discussion. There was some discussion but now just
24 in very specific fuel oil, well, it is a small system
25 as far as functions and scope of the system.

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1 So, it is not as much of a concern from a
2 RTNSS point of view as a more complex system like
3 plant service water is.

4 Is this helpful? Am I explaining or am I
5 just babbling on?

6 CHAIR CORRADINI: No, no. This is
7 helpful for me. Maybe nobody else but it is helpful
8 for me.

9 Did anybody else from the staff want to -
10 -

11 MR. WHITE: I just wanted to say that I
12 was involved with the GEH audit this spring and we
13 focused on service water, component cooling, and also
14 the chilled water system. And what we were looking
15 for was to walk away from that audit with information
16 so that the staff could conclude that these three
17 systems are highly reliable. There is two SECY
18 papers that are giving us guidance that these three
19 systems need to be highly reliable.

20 And we are very close to writing our SER
21 on those three systems, probably within the next
22 three to four weeks. And we will have to see if
23 there is any more dialogue between us and GEH to
24 finalize those SERs.

25 CHAIR CORRADINI: Okay. Any other

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1 comments by members of the committee?

2 Okay, so thank you all. I guess we are
3 back tomorrow morning at 8:30 for glorious Chapters
4 13 and 16.

5 MS. BORSH: Right. Thank you.

6 CHAIR CORRADINI: Thank you.

7 (Whereupon, the foregoing meeting was adjourned to
8 reconvene at 8:30 a.m. on Wednesday, July
9 22, 2009.)

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North Anna

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North Anna Unit 3 COLA Presentation to ACRS Subcommittee Chapter 5



Chapter 5, Reactor Coolant System and Connected Systems: Chapter Topics

- Integrity of Reactor Coolant Pressure Boundary*
- Reactor Vessel*
- Component and Subsystem Design*

* FSAR contains supplemental information (beyond DCD content) on this topic

Chapter 5, Reactor Coolant System and Connected Systems: Supplemental Information

- 5.2 Integrity of Reactor Coolant Pressure Boundary
- STD SUP Identified ASME Codes applicable to preservice and inservice inspection and testing programs
- STD SUP Referenced Regulatory Guide 1.192 for applicable code cases
- STD COL Statement added that all Class 1 austenitic or dissimilar metal welds are included in the referenced certified design

Chapter 5, Reactor Coolant System and Connected Systems: Supplemental Information

5.2 Integrity of Reactor Coolant Pressure Boundary (cont.)

STD COL Provided preservice and inservice inspection and testing program descriptions

STD COL Described NDE accessibility plan for components that are not included in the referenced certified design, to preserve accessibility to piping systems to enable NDE of ASME Code Class 1 austenitic and dissimilar metal welds during inservice inspection

Chapter 5, Reactor Coolant System and Connected Systems: Supplemental Information

5.2 Integrity of Reactor Coolant Pressure Boundary (cont.)

STD COL Described procedures that operators will use for
leak detection monitoring

Chapter 5, Reactor Coolant System and Connected Systems: Supplemental Information

5.3 Reactor Vessel

STD COL Commitment that pressure-temperature limit curves are developed in accordance with Pressure Temperature Limit Report (PTLR), as discussed in Technical Specifications

- PTLR submitted to NRC for approval

STD COL Provided description of reactor vessel material surveillance program

STD SUP Commitment to develop and implement operations procedures to ensure compliance with the Technical Specifications and the pressure-temperature limit curves

Chapter 5, Reactor Coolant System and Connected Systems: Supplemental Information

5.4 Component and Subsystem Design

STD SUP Commitments added to:

- Implement a human factors analysis of the control room displays and controls for the RCS vents
- Develop and implement operating procedures:
 - Prevent severe water hammer
 - Govern use of reactor vent system

Chapter 5, Reactor Coolant System and Connected Systems: SER Open Items

- Two Open Items
 - Submit PTLR (submitted June 17, 2009, with bounding material properties)
 - Provide commitment to update PTLR with plant-specific material properties prior to fuel load
- No Confirmatory Items

North Anna

3

North Anna Unit 3 COLA Presentation to ACRS Subcommittee Chapter 9



Chapter 9, Auxiliary Systems: Chapter Topics

- Fuel Storage and Handling*
- Water Systems*
- Process Auxiliaries*
- Heating, Ventilation, and Air Conditioning
- Other Auxiliary Systems*
- Fire Hazards Analysis*
- Summary of Analysis Supporting Fire Protection Design Requirements

* FSAR contains supplemental information (beyond DCD content) on this topic

Chapter 9, Auxiliary Systems: Supplemental Information

9.1 Fuel Storage and Handling

STD
COL Committed to develop fuel and heavy loads handling procedures, including contents and milestones for completion

STD
COL Described requirements for testing and inspection plans for fuel handling equipment

STD
COL Identified requirements applicable to cranes and lifting devices for overhead heavy loads

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Plant Service Water System (PSWS)

- Function: PSWS rejects heat from nonsafety-related Reactor Component Cooling Water System (RCCWS) and Turbine Component Cooling Water System (TCCWS)
 - No safety-related function
 - Categorized in DCD as RTNSS C
 - DCD 19A specifies level of oversight

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Plant Service Water System (cont)

PSWS consists of 2 independent, 100% redundant trains continuously circulating water through RCCWS and TCCWS heat exchangers.

NAPS
CDI

Cooled by the auxiliary heat sink (AHS) which utilizes mechanical draft plume abated cooling towers

NAPS
COL

Fiberglass reinforced polyester pipe for buried PSWS piping to preclude long-term corrosion

NAPS
CDI

Routine PSWS basin grab samples to detect RCCWS leakage and meet I&E Bulletin 80-10

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Makeup Water System

- Function: Supplies demineralized water to equipment listed in DCD
 - Nonsafety-related system
 - Consists of demineralization subsystem and storage and transfer subsystem

●APS
CDI

Described plant-specific demineralization subsystem. Incorporated DCD description of storage and transfer subsystem.

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Potable Water System and Sanitary Waste Discharge System

- Functions: Provide potable water and sewage collection and treatment for normal plant operation and shutdown periods
 - Nonsafety-related systems

● NAPS
CDI

Described plant-specific systems, which meet requirements specified by authorities having jurisdiction

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Ultimate Heat Sink (UHS)

- UHS provided by Isolation Condenser/Passive Containment Cooling System pools

- Within scope of DCD

●^{TD}
COL

Provided milestone and commitment for development of procedures to connect makeup water sources to UHS seven days after an accident

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Condensate Storage and Transfer System

- Function: Supplies condensate quality water to equipment
 - Nonsafety-related system within scope of DCD

● TD
SUP

Freeze protection provided for the
Condensate Storage & Transfer System

Chapter 9, Auxiliary Systems: Supplemental Information

9.2 Station Water System (SWS)

- Function: Supplies makeup water and feedwater to nonsafety-related systems

● NAPS
CDI System consists of two subsystems:

- Plant Cooling Tower Makeup System – makeup to CIRC and PSWS cooling tower basins
- Pretreated Water Supply System - feedwater to Makeup Water System and fill water to Fire Protection System

Chapter 9, Auxiliary Systems: Supplemental Information

9.3 Other Process Auxiliaries

STD
COL Described Post-Accident Sampling Program

STD
COL Hydrogen Water Chemistry System (HWCS)
included in plant-specific design:

- Adds hydrogen into Feedwater System and oxygen into Offgas System
- Nonsafety-related system

STD &
NAPS
CDI Described HWCS, including storage facilities and inspection and test requirements

Chapter 9, Auxiliary Systems: Supplemental Information

9.3 Other Process Auxiliaries (cont)

STD
COL

Zinc Injection System is not used

- Used in plants where cobalt-containing alloys have been employed to reduce dose rates and personnel exposure in coolant system areas.
- Cobalt not a concern for ESBWR design
 - GEH reduced cobalt in contaminated applications and reduced stainless steel in coolant system
 - Water that flows past stainless steel CRDMs is filtered prior to injection into vessel
 - No reactor coolant recirculation loops

Chapter 9, Auxiliary Systems: Supplemental Information

9.5 Fire Protection System (FPS)

NAPS SUP	Codes, standards, and regulatory guidance
NAPS COL	Simplified diagrams of the site-specific firewater supply piping
NAPS COL	Primary and secondary water sources
STD COL	Milestones for completing design, testing, updating fire hazards analysis, training, and implementing FP program
NAPS COL	Described FP Program staffing and fire brigade organization

Chapter 9, Auxiliary Systems: Supplemental Information

9.5 Fire Protection System (cont)

- STD SUP Commitment to control combustible materials, hazardous materials and ignition sources
- STD COL Quality assurance controls are applied to activities affecting fire protection systems
- STD COL Provided details on fire barriers and electrical raceway fire barrier systems
- STD COL Commitment to develop procedures for manual smoke control

Chapter 9, Auxiliary Systems: Supplemental Information

9.5 Emergency Communication Systems

NAPS COL

Described the onsite and offsite Emergency Communication Systems

- Emergency Notification System (ENS)
- Health Physics Network
- Communication from the control room, TSC, and EOF to NRC headquarters
- Crisis management and fire brigade radio systems
- Transmission system operator communications link
- Insta-Phone System (state and local authorities)

Chapter 9, Auxiliary Systems: Supplemental Information

9.5 Diesel Generator (DG) Fuel Oil Storage and Transfer System

- Function: Supply fuel oil to the Standby and Ancillary DGs
 - No safety-related function
 - Standby DG Fuel Oil Storage and Transfer System: Categorized in DCD as RTNSS C
 - Ancillary DG Fuel Oil Storage and Transfer System: Categorized in DCD as RTNSS B
 - DCD 19A specifies level of oversight

Chapter 9, Auxiliary Systems: Supplemental Information

9.5 DG Fuel Oil Storage and Transfer System (cont)

STD COL Provided milestone and commitment to develop procedures to ensure sufficient diesel fuel oil inventory for standby and ancillary diesel generators

NAPS COL Described corrosion protection system for underground carbon steel piping in DG Fuel Oil Storage and Transfer System

Chapter 9, Auxiliary Systems: Supplemental Information

9A Fire Hazards Analysis (FHA)

NAPS
CDI,
SUP,
&
COL

Provided site-specific information for the
FHA (buildings, codes, drawings,
milestones)

Chapter 9, Auxiliary Systems: SER Open Items

- Eight Open Items
 - Fiberglass piping in PSWS
 - Composition of PSWS materials
 - Maintenance of PSWS; design of chemical addition
 - Standard vs conceptual PSWS design information
 - PSWS ITAAC
 - Initial testing of PSWS Auxiliary Heat Sink
 - Diesel fuel oil inventory margins
 - Industry standards for buried fuel oil piping
- No Confirmatory Items

North Anna

3

North Anna Unit 3 COLA Presentation to ACRS Subcommittee Chapter 10



Chapter 10, Steam and Power Conversion System: Chapter Topics

- Summary Description
- Turbine Generator*
- Turbine Main Steam System
- Other Features of Steam and Power Conversion System*

* FSAR contains supplemental information (beyond DCD content) on this topic

Chapter 10, Steam and Power Conversion System: Supplemental Information

10.2 Turbine Generator

STD
SUP Model N3R-6F52 from GE's N series nuclear steam turbines

STD
COL Turbine maintenance and inspection program:

- Supports the OEM's turbine missile generation probability calculation
- Frequencies established based upon bounding missile probability analysis

STD
COL Turbine missile probability analysis is based on bounding material property values until actual material test specimens available for testing

Chapter 10, Steam and Power Conversion System: Supplemental Information

10.4 Other Features of Steam and Power Conversion System

NAPS
CDI Described plant-specific portions of Circulating Water System (CIRC), including arrangement, components, operation, and instrumentation

NAPS
CDI Chemical Storage and Transfer System and blowdown control CIRC chemistry

NAPS
CDI Station Water System supplies CIRC makeup water

Chapter 10, Steam and Power Conversion System: Supplemental Information

10.4 Other Features of Steam and Power Conversion System (cont)

NAPS
CDI Normal power heat sink includes both dry and hybrid cooling towers

NAPS
CDI Evaluation of CIRC piping or component failure

NAPS
COL Table 10.4-201 summarizes recommended threshold values of key chemistry parameters and associated operator actions to respond to leakage of CIRC water into the condenser

Chapter 10, Steam and Power Conversion System: SER Open Items

- Two Open Items
 - Update FSAR to reflect bounding turbine missile probability analysis
 - Update FSAR to incorporate turbine maintenance and inspection frequencies, based on turbine missile probability analysis
- No Confirmatory Items

North Anna

3

North Anna Unit 3 COLA Presentation to ACRS Subcommittee Chapter 11



Chapter 11, Radioactive Waste Management: Chapter Topics

- Source terms
- Liquid waste management*
- Gaseous waste management*
- Solid waste management*
- Process radiation monitoring system*

* FSAR contains supplemental information (beyond DCD content) on this topic

Chapter 11, Radioactive Waste Management: Supplemental Information

11.2 Liquid Waste Management System

NAPS SUP Included cost benefit analysis for liquid waste system

- Cost parameters used are taken without exception from RG 1.110, Appendix A
- No design changes necessary

STD COL Described design and procedures to address non-radioactive systems that could become contaminated

Chapter 11, Radioactive Waste Management: Supplemental Information

11.2 Liquid Waste Management System (cont)

STD COL Referenced design and procedures that address minimizing contamination

Chapter 11, Radioactive Waste Management: Supplemental Information

11.3 Gaseous Waste Management System

NAPS ESP COL Included cost benefit analysis for gaseous waste system

- Cost parameters used are taken without exception from RG 1.110, Appendix A
- No design changes necessary

Chapter 11, Radioactive Waste Management: Supplemental Information

11.4 Solid Waste Management System

STD SUP Included solid waste cost benefit analysis

- Addressed by liquid and gaseous analysis

STD COL No temporary storage facility for solid waste

STD COL Referenced design and procedures that address 20.1406

STD COL Specified testing and programs to comply with RG 1.143 and RG 8.8

STD COL Referenced design and procedures that address IEB 80-10

STD COL Provided description of the Process Control Program (PCP)

Chapter 11, Radioactive Waste Management: Supplemental Information

11.5 Process Radiation Monitoring System

STD COL Provided references to Offsite Dose Calculation Manual (ODCM) and DCD Table 11.5-9 for derivation of each monitor's lower limit of detection and sensitivity; program for process and effluent monitoring and sampling; and sensitivities, sampling frequencies, and basis for each gaseous and liquid sample

STD COL Provided description of the ODCM

STD COL Provided reference to Chapter 12 for specific analyses for doses to public

Chapter 11, Radioactive Waste Management: SER Open Items

- One Open Item
 - Long term management and storage of radioactive waste
 - Addressed in COLA revision
- Four Confirmatory Items

North Anna

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North Anna Unit 3 COLA Presentation to ACRS Subcommittee Chapter 12



Chapter 12, Radiation Protection: Chapter Topics

- Ensuring That Occupational Radiation Exposures Are ALARA*
- Plant Sources*
- Radiation Protection*
- Dose Assessment*
- Operational Radiation Protection Program*
- Minimization of Contamination and Radwaste Generation*

* FSAR contains supplemental information (beyond DCD content) on this topic

Chapter 12, Radiation Protection: Supplemental Information

12.1 Ensuring That Occupational Radiation Exposures Are ALARA

STD
SUP

Provided description of ALARA program

STD
COL

Complies with RGs 8.8, 8.10 and 1.8

12.2 Plant Sources

STD
COL

Identified contained sources beyond
permanent plant design, and controls for
them

Chapter 12, Radiation Protection: Supplemental Information

12.2 Airborne Releases and Doses Offsite

NAPS
COL

Evaluated annual airborne releases for Unit 3 during normal operations and determined annual airborne offsite doses

- Offsite doses comply 10CFR50 App. I, Sections II.B and II.C

●
NAPS
ESP
COL

No augments required for gaseous effluent releases. Therefore, comply with 10CFR50 App. I, Section II.D.

●
NAPS
ESP
COL

Concentrations comply with 10CFR20 App. B, Table 2, Column 1

Chapter 12, Radiation Protection: Supplemental Information

12.2 Comparison: ESP Application to Unit 3 Gaseous Effluent Concentrations

NAPS
ESP
COL

Unit 3 annual gaseous effluent concentration for each radionuclide is bounded by the concentration for that nuclide in the ESP-ER

NAPS
ESP
COL

Total Unit 3 annual gaseous effluent release activity is much less than the total composite release activity considered in the ESP-ER

Chapter 12, Radiation Protection: Supplemental Information

12.2 Comparison: ESP Application to Unit 3 Gaseous Effluent Doses

Unit 3 annual doses to the MEI from gaseous effluents are lower than those in the ESP-ER

NAPS
ESP
COL

●
NAPS
ESP
VAR

Unit 3 annual gaseous effluent doses for some pathways are not lower than in ESP-ER due to reductions in distances to MEI receptor locations. However, annual total body dose meets the 10 CFR 50, Appendix I, limit.

Chapter 12, Radiation Protection: Supplemental Information

12.2 Liquid Releases and Doses Offsite

NAPS
COL Evaluated annual offsite liquid releases for Unit 3 during normal operations and determined annual offsite liquid doses

- Offsite doses comply with 10CFR50 App. I, Section II.A

● NAPS
ESP
COL No augments required for liquid effluent releases. Therefore, comply with 10CFR50 App. I, Section II.D.

● NAPS
ESP
COL Concentrations comply with 10CFR20 App. B, Table 2, Column 2

Chapter 12, Radiation Protection: Supplemental Information

12.2 Comparison: ESP Application to Unit 3 Liquid Effluent Concentrations

NAPS
ESP
COL

Total Unit 3 annual liquid effluent release activity is less than the total composite release activity in the ESP-ER

● NAPS
ESP
VAR

Unit 3 annual liquid effluent activities for some radionuclides are not bounded by the values in the ESP-ER. However, Unit 3 total release activity is less than total composite activity in ESP-ER, and concentrations of all nuclides are within limits

Chapter 12, Radiation Protection: Supplemental Information

12.2 Comparison: ESP Application to Unit 3 Liquid Effluent Doses

NAPS
ESP
COL

Unit 3 annual liquid effluent doses for all pathways are lower than in the ESP-ER

NAPS
ESP
COL

Unit 3 annual doses to the MEI from liquid effluents are lower than those in the ESP-ER

Chapter 12, Radiation Protection: Supplemental Information

12.2 Compliance with 10CFR20.1301

NAPS
ESP
COL

Evaluated offsite doses due to Units 1, 2, and 3, combined with doses due to Independent Spent Fuel Storage Installation (ISFSI). Used updated doses to characterize doses from existing units and total offsite doses.

NAPS
ESP
VAR

●NAPS
ESP
COL

Offsite doses to members of public comply with 10CFR20.1301

Chapter 12, Radiation Protection: Supplemental Information

12.2 Compliance with 10CFR20.1302

NAPS
ESP
COL

Compliance with 10CFR20.1302 dose limits for individual members of public is demonstrated through surveys of radiation levels and demonstration that calculated total effective dose equivalent is within limits

Chapter 12, Radiation Protection: Supplemental Information

12.3 Radiation Protection

STD
COL

Addressed Access to “Very High Radiation Areas” and airborne radiation monitoring instrumentation

Chapter 12, Radiation Protection: Supplemental Information

12.4 Dose Assessment

NAPS
SUP

Evaluated annual collective doses to construction workers

- Dose calculated in ESP-ER remains conservative estimate of maximum annual collective dose to construction work force

Chapter 12, Radiation Protection: Supplemental Information

12.5 Operational Radiation Protection Program

STD
COL

Described operational radiation
protection program

Chapter 12, Radiation Protection: SER Open Items

- Two Open Items
 - Revisions to address minimization of contamination, including incorporation of NEI 08-08
 - RAI on monitoring construction site for radiation
- Five Confirmatory Items



Presentation to the ACRS Subcommittee

North Anna Power Station (NAPS) - Unit 3 COL Application Review

**SER/OI Chapter 10
Steam and Power Conversion (SPC) Systems**

July 21, 2009

ACRS Subcommittee Presentation

SER/OI Chapter 10

- Project Managers
 - Thomas Kevern, Lead PM, DNRL/NGE1
 - Michael Eudy, Chapter PM, DNRL/NGE1
- Technical Staff
 - Neil Ray, Acting Chief, CIB2
 - John Segala, Chief, SBP
 - George Georgiev, Reviewer, CIB2
 - Devender Reddy, Reviewer, SBP
 - Eduardo Sastre, Reviewer, CIB2

Overview of North Anna COL Chapter 10 - Steam and Power Conversion Systems

FSAR Section		Summary of COL and Departures/Supplements
10.2*	Turbine-Generator	<p>*STD COL 10.2-1-A Turbine Maint/Inspect Program</p> <p>*STD COL 10.2-2-A Turbine Missile Probability Analysis</p> <p>STD SUP 10.2-1 Turbine Design (GE Model N3R-6F52)</p>
10.3	Main Steam System	Flow Accelerated Corrosion – addressed in SER Section 6.6
10.4*	Other Features of Steam & Power Conversion (SPC) Systems	<p>*NAPS CDI - Circulating Water System (CWS) – (plant specific design)</p> <p>STD COL 10.4-1-A Water Quality – (key chemistry parameters for CWS water leakage into condenser)</p>

TURBINE GENERATOR

Section 10.2

- STD SUP 10.2-: General Electric Model N3R-6F52 is being specified by the applicant
- COL Items:
 - STD COL 10.2-1-A – Inservice Maintenance and Inspection of Turbine Rotors
 - STD COL 10.2-2-A – Turbine Missile Probability Analysis
 - Staff Evaluation
 - Upon receipt of the additional information, Staff will evaluate accordingly.

ACRS Subcommittee Presentation
SER/OI Chapter 10
Technical Topics of Interest
10.3.6 Flow accelerated corrosion

- The staff guidance identifies the need for a FAC program in SRP Section 10.3.6
- The North Anna FAC program is part of the augmented inservice inspection program in Chapter 6 (STD COL 6.6-1-A)
- The staff's review was included in the Chapter 6 presentation to the ACRS Subcommittee in June 2009

ACRS Subcommittee Presentation
SER/OI Chapter 10
Technical Topics of Interest
10.4.5 Circulating Water System - CDI

- **NAPS CDI:**
The applicant provided plant specific design, operation, instrumentation and controls, flood protection, and chemical injection.
- **Staff Evaluation:**
Evaluated the site-specific information in accordance with the Commission Regulations (GDC 4) and SRP guidelines.
- **Conclusion:**
The staff finds the site-specific design acceptable - no open items.

ACRS Subcommittee Presentation

SER/OI Chapter 10

Circulating Water System (Cont'd)

(Chemical Injection:10.4.5.2.2.1 – STD COL 10.4-1-A)

- STD COL 10.4-1-A:
Requires that the COL applicant provide threshold values and recommended operators actions for chemistry excursions in the condensate system.
- Staff Evaluation:
The staff reviewed FSAR Table 10.4-201, which lists the recommended water quality control parameters and action levels for the reactor water and feedwater during power operations.
- Conclusion:
The NRC staff finds the provided water quality control parameters acceptable because the stated values are within the limits specified by RG 1.56 Revision 1.

ACRS Subcommittee Presentation

SER/OI Chapter 10

Discussion/Committee Questions

ACRS Subcommittee Presentation

SER/OI Chapter 10

Technical Topics of Interest

10.3.6 Flow accelerated corrosion (Backup Slide)

- The North Anna FAC program is part of the augmented inservice inspection program in Chapter 6 (STD COL 6.6-1-A)
- The elements of the program are described in COLA Section 6.6.7.1
- The program follows the EPRI NSAC-202L industry guidance, which addresses the concerns in GL 89-08
- The program is listed under the Inservice Inspection operational program in COLA Table 13.4-201
- The applicant will evaluate susceptibility of the as-built system and implement the FAC program prior to fuel load

ACRS Subcommittee Presentation
SER/OI Chapter 10
Technical Topics of Interest
10.4.5 Circular Water System
(Chemical Injection - Backup slide)

- CWS water chemistry is maintained by the Chemical Storage and Transfer System.
- Plant chemistry specifies the required chemicals used within the system.
- Chemical injection maintains a non-corrosive, non-scale-forming condition and limits the biological film formation that reduces the heat transfer rate in the condenser and cooling towers.
- Chemicals selected are compatible with selected materials or components used in the CWS.



Presentation to the ACRS Subcommittee

North Anna Unit 3 COL Application Review

SER/OI Chapter 11 Radioactive Waste Management System

July 21, 2009

ACRS Subcommittee Presentation

SER/OI Chapter 11

Staff Review Team

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ACRS Subcommittee Presentation

SER/OI Chapter 11

Content of Chapter 11

- FSAR Chapter 11 incorporates by reference ESBWR DCD Chapter 11.
 - Supplemental information and COL information items provided in Sections 11.2, 11.3, 11.4, and 11.5.
- Chapter 11 Topics
 - 11.1 Source Terms
 - 11.2 Liquid Waste Management System
 - 11.3 Gaseous Waste Management System
 - 11.4 Solid Waste Management System
 - 11.5 Process Radiation Monitoring System

ACRS Subcommittee Presentation

SER/OI Chapter 11

Chapter 11 COL Items

- NAPS SUP 11.2-1 – Cost Benefit Analysis for the LWMS
- STD COL 11.2-1-A – Implementation of IE Bulletin 80-10
- STD COL 11.2.2-A – Implementation of Part 20.1406
- NAPS ESP COL 11.1-1 - Compliance with 10 CFR Part 50, Appendix I, Section II.D
- STD SUP 11.4-1 – Cost Benefit Analysis for the SWMS
- STD COL 11.4-1-A – SWMS Processing Subsystem RG 8.8 and 1.143 Compliance
- STD COL 11.4-2-A – Compliance with IE Bulletin 80-10
- STD COL 11.4-3-A – Process Control Program
- STD COL 11.4-4-A – Temporary (LLW) Storage Facility
- STD COL 11.4-5-A – Compliance with Part 20.1406
- STD COL 11.5-1-A – Sensitivity or Subsystem Lower Limit of Detection
- STD COL 11.5-2-A – Offsite Dose Calculation Manual
- STD COL 11.5-3-A – Process and Effluent Monitoring Program
- STD COL 11.5-4-A – Site Specific Offsite Dose Calculation Manual
- STD COL 11.5-5-A – Instrumentation Sensitivities

ACRS Subcommittee Presentation

SER/OI Chapter 11

Regulations and Review Guidance

- GDCs 60, 61, and 64
- 10 CFR Part 20.1301, 20.1302, and 20.1406.
- 10 CFR Part 50.34a, 50.36a, and Appendix I to Part 50
- Primary SRP Sections: 11.1, 11.2, 11.3, 11.4, and 11.5
- Regulatory Guides: 1.109, 1.110, 1.143, and 8.8
- Generic Letter 89-01 and SECY-05-0197
- IE Bulletin 80-10, NEI 07-09A Generic ODCM* Template, and NEI 07-10A Generic PCP* Template

* As operational programs under FSAR Section 13.4.

ACRS Subcommittee Presentation SER/OI Chapter 11

Technical Topics of Interest

- **Section 11.1 – Source Terms**
 - Incorporation by reference of ESBWR DCD with no departures or supplements.
- **Section 11.2 - LWMS**
 - Cost-benefit analysis as required under Part 50, Appendix I Section II.D using guidance of RGs 1.109 and 1.110.
 - Description of system features that implement IE Bulletin 80-10 and requirements of Part 20.1406.
 - Incorporation of two STD COL items from ESBWR DCD, Section 11.2.
 - References to supporting information in FSAR Sections 12.4, 12.5, 12.6, and 13.5.
- **Section 11.3 - GWMS**
 - Cost-benefit analysis as required under Part 50, Appendix I Section II.D using guidance of RGs 1.109 and 1.110.

ACRS Subcommittee Presentation

SER/OI Chapter 11

Technical Topics of Interest

- **Section 11.4 – SWMS**

- No cost-benefit analysis included, effluent releases of SWMS are included in the cost-benefit analyses of FSAR Sections 11.2 and 11.3.
- Applicant identifies option of using portable skid-mounted SWMS to supplement permanently installed subsystems.
- Applicant endorses NEI Generic PCP Template 07-10A until a site specific PCP is prepared under a license condition (FSAR Section 13.4).
- Applicant not using temporary LLW storage facilities (RAI 11.04-3 open).
- System features that implement IE Bulletin 80-10 and requirements of Part 20.1406.
- Incorporation of five STD COL items from ESBWR DCD, Section 11.4.
- References to information in FSAR Sections 12.4, 12.5, 12.6, 13.4, and 13.5.

ACRS Subcommittee Presentation

SER/OI Chapter 11

Technical Topics of Interest

- **Section 11.5 - PRMS**

- Plant and site-specific provisions for sampling liquid process streams and effluent release points, updated from ESBWR DCD, Section 11.5.
- Incorporation of five STD COL items from ESBWR DCD, Section 11.5.
- Supplemental information provided supporting each of the five STD COL items.
- Applicant endorses NEI Generic ODCM Template 07-09A until a plant and site-specific ODCM is prepared under a license condition (FSAR Section 13.4).
- References to information in FSAR Sections 9.2.1, 9.2.4, 9.2.6, 10.4.5, 11.2, 12.2, and 13.4.
- Cost-benefit analysis not required for this system.

ACRS Subcommittee Presentation

SER/OI Chapter 11

Conclusion

- **Section 11.1 – Source Terms**

The applicant has adopted by reference ESBWR DCD, Section 11.1. Based on a review of the applied radioactive effluent source terms and confirmation of offsite dose results, the staff finds this approach acceptable.

- **Section 11.2 – LWMS**

- The applicant has adequately addressed STD COL information items 11.2-1-A and 11.2.2-A using the guidance of SRP Section 11.2 and IE Bulletin 80-10, and requirements of Part 20.1406 and Part 50.

- The applicant has met the ALARA criteria of Section II.D of App. I to Part 50. The staff confirmed the results of a site-specific cost-benefit analysis in that LWMS augment is not expected to further reduce population doses within 80-km (50-mile) of the site.

- **Section 11.3 – GWMS**

- The applicant has adequately addressed the guidance of SRP Section 11.3 and requirements of Part 50.

- The applicant has met the ALARA criteria of Section II.D of App. I to Part 50. The staff confirmed the results of site-specific cost-benefit analyses in that GWMS augment is not expected to further reduce population doses within 80-km (50-mile) of the site.

ACRS Subcommittee Presentation

SER/OI Chapter 11

Conclusion

- **Section 11.4 – SWMS**

- The applicant has adequately addressed STD COL information items 11.4-1-A to 11.4-3-A and 11.4-5-A and guidance of SRP Section 11.4, RGs 8.8 and 1.143, and IE Bulletin 80-10; and SECY-05-0197, GL 89-01, and Part 20.1406.
- The applicant has not adequately addressed STD COL information item 11.4-4-A on provisions to store LLW in the short and long-terms. RAI 11.4-03 is open pending the submission of additional information by the applicant.
 - Two confirmatory items open on updating reference citations.
- The staff finds the endorsement of NEI Generic PCP Template acceptable, as it relates to the processing, classification, transportation, and disposal of LLW under 10 CFR Part 20 and 61 and DOT shipping regulations.
- The applicant has met the ALARA criteria required in Section II.D of Appendix I to Part 50, given that all associated effluent releases from the SWMS are expected to be managed through the operation of the LWMS and GWMS.

ACRS Subcommittee Presentation

SER/OI Chapter 11

Conclusion

- **Section 11.5 – PRMS**
 - The applicant has adequately addressed STD COL information items 11.5-1-A to 11.5-5-A using the guidance of SRP Section 11.5 and Part 50, SECY-05-0197, and GL 89-01.
 - The applicant has described processes, through PRMS instrumentation and sampling, to control and monitor releases of liquid and gaseous radioactive materials into the environment.
 - Two confirmatory items open on updating reference citations.
 - The staff finds the use of NEI Generic ODCM Template acceptable, as it relates to controlling and monitoring effluent releases and doses to members of the public under the requirements of Appendix I to Part 50 and 10 CFR 20.1301 and 20.1302, and 40 CFR Part 190.
- **Summary of Remaining SER Open Items**
 - One RAI on LLW storage.
 - Four Confirmatory Items on updating reference citations.

ACRS Subcommittee Presentation SER/OI Chapter 11

Discussion/Committee Questions



Presentation to the ACRS Subcommittee

North Anna Unit 3 COL Application Review

SER/OI Chapter 12 Radiation Protection

July 21, 2009

ACRS Subcommittee Presentation North Anna SER/OI Chapter 12

Staff Review Team

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 - Ilka T. Berrios, Chapter PM, DNRL/NGE 1
- Technical Staff
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 - Timothy Frye, Branch Chief, DCIP/CHPB

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Content of Chapter 12

FSAR Chapter 12 incorporates by reference ESBWR DCD Chapter 12
-Supplemental information and COL information items provided in
Sections 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6.

Chapter 12 Topics

- 12.1 Ensuring that Occupational Radiation Exposures Are ALARA
- 12.2 Plant Sources
- 12.3 Radiation Protection
- 12.4 Dose Assessment
- 12.5 Operational Radiation Protection Program
- 12.6 Minimization of Contamination and Radwaste Generation

ACRS Subcommittee Presentation

SER/OI Chapter 12

Content of Chapter 12

- STD COL 12.1-1-A Regulatory Guide 8.10
- STD COL 12.1-2-A Regulatory Guide 1.8
- STD COL 12.1-3-A Operational Considerations
- STD COL 12.1-4-A Regulatory Guide 8.8
- STD COL 12.2-4-A Other Contained Sources
- STD COL 12.3-2-A Operational Considerations
- STD COL 12.3-3-A Controlled Access
- NAPS SUP 12.4-1 Dose to construction workers
- STD COL 12.5-1-A Equipment, Instrumentation, and Facilities
- STD COL 12.5-2-A Compliance with 50.34(f)(2)(xxvii) and NUREG-0737 Item III.D.3.3
- STD COL 12.5-3-A Radiation Protection Program
- STD SUP 12.6-1 Minimization of Contamination to Facilitate Decommissioning
- NAPS ESP COL 11.1-1 – Compliance with 10 CFR Part 50, Appendix I, Section II.D
- NAPS ESP VAR 12.2-1 – Gaseous Pathway Doses
- NAPS ESP VAR 12.2-3 – Annual Liquid Effluent Releases
- NAPS ESP VAR 12.2-4 – Existing Units' and Total Site Doses
- NAPS COL 12.2-2-A – Airborne Effluents and Doses
- NAPS COL 12.2-3-A – Liquid Effluents and Doses

Note: NAPS ESP VAR 12.2-2 (Annual Thyroid Dose) deleted in FSAR in Rev. 1 because of a revised thyroid dose estimate.

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Key Regulations and Review Guidance

- 10 CFR 19.11 & 19.12
- 10 CFR Part 20, 20.1301, 20.1302, and Appendix B to Part 20
- 10 CFR 50.34(f), 50.34a, 50.36a, and Appendix I to Part 50
- 10 CFR Part 52
- 10 CFR Parts 70 & 71
- 40 CFR Part 190, implemented under Part 20.1301(e)
- GDC 19
- NUREG-1555
- Generic Letter 89-01
- Primary SRP Sections: 12.1, 12.2, 12.3, 12.4, 12.5, 11.2 and 11.3
- Regulatory Guides 1.8, 1.33, 1.109, 1.110, 1.111, 1.112, 1.113, 1.206, 4.21, 8.2, 8.4, 8.7, 8.8, 8.9, 8.10, 8.13, 8.15, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, 8.38

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

NEI Templates

- NEI 07-03A* Generic FSAR Guidance for Radiation Protection Program Description (Section 12.5 and 12.1)
- NEI 07-08* Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (Section 12.1)
- NEI 08-08* Generic FSAR Template Guidance for Life Cycle Minimization of Contamination (Section 12.3)

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Technical Topics of Interest

- **Section 12.1 – Ensuring That Occupational Radiation Exposures Are ALARA**
 - Staff confirmed applicant's commitment to having an effective ALARA policy by evaluating applicant's
 - ALARA policy considerations
 - Operational considerations
 - In response to staff RAI, applicant described procedures associated with operation of the Inclined Fuel Transfer Tube system
 - Four COL items addressed
 - Applicant referenced NEI Templates 07-08 (Ensuring that Occupational Radiation Exposures are ALARA) and NEI Template 07-03 (Radiation Protection Program) to address the Section 12.1 COL items
 - Two confirmatory items

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Technical Topics of Interest

- **Section 12.2 – Plant Sources**
 - Staff evaluated applicant's description of contained radioactive sources (calibration, radiography, check) not described in the DCD
 - Calibration sources are traceable to NIST or equivalent
 - Radiography sources are surveyed upon entry to the site
 - In response to staff RAI, applicant described plant radiation protection procedures to control these contained sources
 - One COL item addressed
 - No open items
 - Evaluation of Section 12.2.2 (Airborne and Liquid Sources for Environmental Consideration) is not included here and will be presented after this presentation by the supporting reviewer

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Technical Topics of Interest

- **Section 12.3 – Radiation Protection**

- In response to staff RAI, applicant provided the criteria for the placement and number of portable airborne radioactivity monitors that will be used at North Anna, Unit 3
- In response to staff RAI, applicant described additional access controls to Very High Radiation Areas
- Staff evaluated how the applicant's operational program and the facility's procedures for operation will meet the requirements of 10 CFR 20.1406
- In response to staff RAI, applicant will address any additional COL items pertaining to implementation of 20.1406
- Two COL items addressed
- Applicant referenced NEI Template 08-08 (Life Cycle Minimization of Contamination) to address the aspects of the operational program pertaining to the minimization of contamination.
- One open and three confirmatory items

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Technical Topics of Interest

- **Section 12.4 – Dose Assessment**
 - Doses to construction workers were addressed in the ESP-ER and assessed in ESP-FEIS
 - Staff evaluated the effects of updated ESP-ER data on the annual collective dose to construction workers
 - Collective worker dose calculated in ESP FEIS remains bounding
 - No COL items pertain to this Section
 - One open item

ACRS Subcommittee Presentation

North Anna SER/OI Chapter 12

Technical Topics of Interest

- **Section 12.5 – Operational Radiation Protection Program**
 - Staff confirmed that the applicant has an acceptable Radiation Protection Program by evaluating applicant's
 - Operation Program milestones (FSAR Section 13.4)
 - Management Policy
 - Organization (FSAR Section 13.1)
 - Facilities, Instrumentation, and Equipment
 - Procedures (FSAR Section 13.5)
 - In response to staff RAI, applicant confirmed the use of appropriate milestones to implement the ALARA/RP program
 - Three COL items addressed
 - Applicant referenced NEI Template 07-03 (Radiation Protection Program) to address the Section 12.5 COL items
 - One confirmatory item

ACRS Subcommittee Presentation

SER/OI Chapter 12

Section 12.2.2 Technical Topics of Interest

- **Annual Radioactive Effluent Releases**
 - Incorporation by reference of ESBWR DCD with no departures or supplements
- **Plant and Site-Specific Information and Assumptions**
 - DCD plant data carried forward into FSAR Chapter 12.2.2.2 analyses
 - Site specific atmospheric dispersion and deposition parameters
 - Site specific aquatic dilution factors and other assumptions
 - Assumptions on dose contribution from direct external radiation (TB and ISFSI)
 - Site specific offsite dose receptor locations, pathways, and land-use data
 - Collective population doses from liquid and gaseous effluents
 - FSAR references to supporting information: ESBWR DCD, Section 12.2.2; FSAR Section 2.3.5; FSAR Part 7: Departures Report; and ESP-ER Section 5.4
- **Dose Calculation Methodology**
 - GASPAR II – Gaseous effluents
 - LADTAP II – Liquid effluents

ACRS Subcommittee Presentation

SER/OI Chapter 12

Section 12.2.2 Conclusions for Offsite Doses

- **Liquid and Gaseous Effluent Releases**

The applicant has adopted, by reference, ESBWR DCD, Section 12.2.2 annual effluent releases. Based on a review of the applied radioactive effluent releases and confirmation of offsite dose results, the staff finds this approach acceptable.

- **Compliance with 10 CFR Part 20**

For liquid and gaseous effluent releases and doses to members of the public, the staff concludes that the results of the dose assessment and estimates of offsite liquid and gaseous effluent concentrations are acceptable and meet the applicable requirements of Part 20.1301, 20.1302, Appendix B (Table 2) to Part 20, and Part 20.1301(e).

- **Compliance with 10 CFR Part 50**

For liquid and gaseous effluent releases and doses to maximally exposed members of the public, the staff concludes that the results of the dose assessment are acceptable and meet the applicable requirements of Part 50, Appendix I, Sections II.A to II.C design criteria.

The applicant has met the ALARA objectives of Section II.D of Appendix I to Part 50. The staff finds the results of plant and site-specific collective dose assessment acceptable for populations located within an 80-km (50-mile) radius from the site.

ACRS Subcommittee Presentation

SER/OI Chapter 12

Section 12.2.2 Conclusions for Offsite Doses

- **Compliance with NAPS COL and NAPS ESP Items**

The applicant has adequately addressed NAPS COL 12.2-2-A (Airborne Effluents and Doses) and 12.2.3-A (Liquid Effluents and Doses), and NAPS ESP 11.1-1 (Compliance with 10 CFR Part 50, Appendix I, Section II.D) using the guidance of SRP Sections 11.2 and 11.3 and Regulatory Guide 1.206.

- **Adequacy of NAPS Variances**

The applicant has identified three variances. The staff finds the elements and dispositions of NAPS ESP VAR 12.2-1 (Gaseous Pathway Doses), NAPS ESP VAR 12.2-3 (Annual Liquid Effluent Releases), and NAPS ESP VAR 12.2-4 (Existing Units' and Total Site Doses) acceptable.

- **Summary of Remaining SER Open Items**

One Confirmatory Item on further elaboration of one ESP variance.

ACRS Subcommittee Presentation North Anna SER/OI Chapter 12

Discussion/Committee Questions



Presentation to the ACRS Subcommittee

North Anna Power Station (NAPS) - Unit 3 COL Application Review

**SER/OI Chapter 9
Auxiliary Systems**

July 21, 2009

North Anna COL Chapter 9

Staff Review Team

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 - Eduardo Sastre, Reviewer, CIB2
 - Edward McCann, Reviewer, SFPB
 - Eugene Eagle, Reviewer, IEC2
 - Robert Radlinski, Reviewer, SBPB

Summary of Supplemental Information for North Anna COL Chapter 9

FSAR Section		Summary of Supplemental Information
9.1.4	Light Load handling System (Related to Refueling)	STD COL 9.1.4-A: Fuel Handling Operation STD SUP 13.5-25: Fuel Handling Procedures
9.1.5	Overhead Heavy Load Handling System (OHLHS)	STD COL 9.1.5-A: Handling of Heavy Loads
9.2.1*	Plant Service Water System (PSWS)	NAPS CDI: PSWS Component Design Characteristics NAPS COL 9.2.1-1-A: Material Selection NAPS SUP 9.2.1-1: Basin Reserve Storage Capacity
9.2.3	Makeup Water System (MWS)	NAPS CDI: Provides site-specific information
9.2.4	Potable and Sanitary Water System	NAPS CDI: Provides site-specific information
9.2.5	Ultimate Heat Sink (UHS)	STD COL 9.2.5-1-H: Procedure development to support make-up to the UHS

Summary of Supplemental Information for North Anna COL Chapter 9 (cont.)

FSAR Section		Summary of Supplemental Information
9.2.6	Condensate Storage and Transfer System	STD SUP 9.2.6-1: Freeze protection
9.2.10	Station Service Water System	NAPS CDI: Provides site-specific information
9.3.2*	Post Accident Sampling Program	STD COL 9.3.2-1-A: Post Accident Sampling Program
9.3.5	Standby Liquid Control System	STD SUP 9.3.5-1: System Description
9.3.9*	Hydrogen Water Chemistry System	STD COL 9.3.9-1-A: Implementation of Hydrogen Water Chemistry STD CDI: Inspection and Testing, Instrumentation Controls NAPS CDI: System Description, Hydrogen Storage Facility STD COL 9.3.9-2-A: Hydrogen and Oxygen Storage and Supply
9.3.10*	Oxygen Injection System	NAPS COL 9.3.10-1-A: Oxygen Storage Facility

Summary of Supplemental Information for North Anna COL Chapter 9 (cont.)

FSAR Section		Summary of Supplemental Information
9.3.11	Zinc Injection System (not used)	STD COL 9.3.11-1-A: System Description STD COL 9.3.11-2-A: Test and Inspections
9.5.1*	Fire Protection System	NAPS COL 9.5.1-1-A: Secondary Firewater Storage Source NAPS COL 9.5.1-2-A: Secondary Firewater Capacity NAPS COL 9.5.1-4-A: Piping and Instrumentation Diagrams NAPS COL 9.5.1-10-H: Fire Brigade STD COL 9.5.1-5-A: Fire Barriers STD COL 9.5.1-6-H: Smoke Control STD COL 9.5.1-7-H: FHA Compliance Review STD COL 9.5.1-8-A: Fire Protection Program Description STD COL 9.5.1-11-A: Quality Assurance NAPS SUP 9.5.1-1: Codes, Standards, and Regulatory Guidance STD SUP 9.5.1-3: Combustible and Ignition Source Controls STD COL 9A.7-1-A: Fire Drawings NAPS COL 9A.7-2-A: Detailed Fire Hazards Analysis of the yard NAPS SUP 9A-01: Codes, Standards, and Regulatory Guidance

Summary of Supplemental Information for North Anna COL Chapter 9 (cont.)

FSAR Section		Summary of Supplemental Information
9.5.2*	Communication Systems	NAPS COL 9.5.2.5-1-A: Emergency Notification System NAPS COL 9.5.2.5-2-A: Grid Transmission Operator NAPS COL 9.5.2.5-3-A: Offsite Interfaces (1) NAPS COL 9.5.2.5-4-A: Offsite Interfaces (2) NAP COL 9.5.2.5-5-A: Fire Brigade Radio System
9.5.4*	Fuel Oil Storage and Transfer	STD COL 9.5.4-1-A: Fuel Oil Capacity NAPS COL 9.5.4-2-A: Protection of Underground Piping

Plant Service Water Systems

Section 9.2.1 Open Items

PSWS Open Item (OI 9.2.1-10):

- PSWS treatment in accordance with 10 CFR 50.65, “Maintenance Rule”

PSWS Open Item (OI 9.2.1-12):

- Address how the design capability of the Auxiliary Heat Sink (AHS) will be verified by initial plant test program
- Address how design features which minimize an AHS/PSWS water hammer event are tested

PSWS Open Item (OI 9.2.1-13): NAPS COL 9.2.1.1-A

- Special Quality Assurance provisions for the use of fiberglass for underground Regulatory Treatment of Non-Safety System (RTNSS) “Criterion C” application

Plant Service Water Systems

Section 9.2.1 Confirmatory Items

PSWS Confirmatory Item (OI 9.2.1-8):

- Address revised Interface Requirement that confirms the PSWS can remove the required BTUs over a period of seven days without active make-up

PSWS Confirmatory Item (OI 9.2.1-9): NAPS COL 9.2.1.1-A

- Specific composition or properties of above ground materials to be used in the PSWS confirm

PSWS Confirmatory Item (OI 9.2.1-11):

- Clearly identify the plant specific information in the FSAR that addressed the CDI identified in the ESBWR DCD

Process Sampling System and Post-Accident Sampling Program Section 9.3.2

- Section 9.3.2 addressed Process Sampling System
 - STD COL 9.3.2-1-A – Post-Accident Sampling Program
 - Develop a post-Accident Sampling program
 - The post-accident sampling program meets the recommendations of NUREG-0800, Section 9.3.2 in lieu of Post Accident Sampling System

Hydrogen Water Chemistry System (HWCS)

Section 9.3.9

- Section 9.3.9 addressed Hydrogen Water Chemistry System
 - STD COL 9.3.9-1-A – Implementation of HWCS
 - Determine if HWCS is to be implemented
 - HWCS utilizes the guidance included in the Electric Power Research Institute (EPRI) Report NP-4947-SR, “BWR Hydrogen Water Chemistry Guidelines.”
 - NAPS COL 9.3.9-2-A Hydrogen Storage and Supply
 - Provide hydrogen storage facility requirements and appropriate supply system
 - HWCS installations including the means for storing and handling hydrogen meet the EPRI Report NP-5283-SR-A, “Guidelines for Permanent BWR Hydrogen Water Chemistry Installations.”

Oxygen Injection System (OIS)

Section 9.3.10

- Section 9.3.10 addressed Oxygen Injection System
 - NAPS COL 9.3.10-1-A – Oxygen Storage Facility
 - The applicant described the bulk oxygen storage facility
 - The requirements for design, operation, maintenance, surveillance, and testing of the oxygen storage facility are specified in EPRI Report NP-5283-SR-A, “Guidelines for Permanent BWR Hydrogen Water Chemistry Installations.”

Fire Protection System

Section 9.5.1

Regulations and Review Guidance

- GDCs: 3, 5, 19, and 23
- 10 CFR 50.48
- 10 CFR 52
- 10 CFR 52.47(b)(1)
- SRP Section 9.5.1
- Regulatory Guide 1.189.
- SECYs 90-016, 93-087, and 94-084

Fire Protection System

Section 9.5.1 (cont.)

Enhanced Fire Protection Criteria

- Ensure post-fire-safe-shutdown assuming all equipment in any one fire area (excluding control room and containment) will be rendered inoperable by fire and that re-entry is not possible for mitigation
- Ensure that smoke, hot gasses, or the fire suppressant will not migrate into other fire areas to the extent that post-fire-safe-shutdown could be adversely affected

Fire Protection System

Section 9.5.1 (cont.)

Review Highlights

- RG 1.189 was the primary guidance used to review the application. It contains extensive fire protection guidance that has been updated for new reactors
- Review focused on ensuring that the site specific and DCD interfacing fire protection program attributes complied with regulatory requirements and guidance including enhanced fire protection features per SECYs for items such as secondary water source, fire barriers, smoke control, fire pumps, fire protection water supply system, QA, fire brigade, communication, and emergency lighting
- MCR protection based on final hazards analysis and fire prevention procedures
- Multiple spurious in accordance with staff expectations
- Smoke effects have been properly considered

Fire Protection System

Section 9.5.1 (cont.)

Issues of Interest

- 20 RAIs were written and resolved – All items resolved
- Fire Brigade – Extensive guidance given in RG 1.189 was met.
- Smoke Control – Smoke dampers, fire barriers, manual smoke control procedures, and automatic sprinklers where applicable
- Fire hazards Analysis (FHA) – Applicant committed to do a compliance review of the as-built plant against the FHA (includes safe-shutdown

Fire Protection System

Section 9.5.1 (cont.)

Conclusion

- Section 9.5.1

The applicant has adequately addressed COL and Supplemental information items involving the fire protection system. The staff concludes that the requirements of GDC 3, 5, 19, and 23 of Appendix A to 10 CFR 50, 10 CFR 50.48, SECY 90-016, SECY 93-087, and SECY 94-084 are satisfied for this section.

Communication Systems Section 9.5.2

Section 9.5.2 provides for intraplant communications and plant-to-offsite communications during normal, maintenance, transient, fire, and accident conditions

- Applicable regulatory requirements for the Emergency Notification System and prompt communications among principal response organizations and emergency response personnel are:
 - 10CFR50, Appendix E, Part IV.E.9
 - 10CFR50.47(b)(5) and (b)(6)

- The related acceptance criteria are:
 - NRC Bulletin 80-15
 - NUREG 0696, and
 - NUREG 0654/FEMA-REP-1, Revision 1

- Section 9.5.2 of the North Anna 3 COL FSAR incorporates by reference Section 9.5.2 of the ESBWR DCD, Revision 5

- In addition, Dominion adequately addressed the 5 COL Items

Communication Systems Section 9.5.2 (cont)

- The five COL Items:
 - NAPS COL 9.5.2.5-1-A Emergency Notification System
 - NAPS COL 9.5.2.5-2-A Grid Transmission Operator
 - NAPS COL 9.5.2.5-3-A Offsite Interfaces (1)
 - NAPS COL 9.5.2.5-4-A Offsite Interfaces (2)
 - NAPS COL 9.5.2.5-5-A Fire Brigade Radio System
- COL Items relevant to COL Part 5: Emergency Plan, Sections II.E and II.F
- COL Items relevant to COL Part 2: Section 13.3 Emergency Planning
- The staff concludes that the applicant's communications system used in intra-plant and plant-to-offsite communications, is acceptable and meets the requirements of 10CFR50, Appendix E, IV.E.9 and 10CFR50.47 (b)(5) and (b)(6) and NRC Bulletin 80-15.

Diesel Generator Support Systems

Sections 9.5.4-9.5.8

- FSAR Chapter 9, Sections 9.5.4-9.5.8 incorporate by reference ESBWR DCD Sections 9.5.4-9.5.8.
- Supplemental information and COL information items are provided in Section 9.5.4. The remaining sections are IBR with no departures or supplements.
 - STD COL 9.5.4-1-A: Fuel Oil Capacity
 - NAPS COL 9.5.4-2-A: Protection of Underground Piping

Diesel Generator Support Systems

Sections 9.5.4-9.5.8

Regulations and Review Guidance

Note: The ESBWR diesel generators (SDGs and ADGs) and their support systems are nonsafety-related and RTNSS

- GDC: 17
- Primary SRP Sections: 9.5.4-9.5.8 (as applicable)
- Regulatory Guides: 1.137 (as applicable)
- Other guidance: SECY-94-084, Criteria B and C; and Availability Controls Manual (ACLCO 3.8.1 and 3.8.2)

Diesel Generator Support Systems

Sections 9.5.4-9.5.8

Technical Topics of Interest

COL Items

- STD COL 9.5.4-1-A: Applicant described the procedural controls to ensure that sufficient fuel oil is available onsite to allow each DG to operate continuously for seven days based on regular monitoring and tracking usage against planned deliveries.
- NAPS COL 9.5.4-2-A: Underground portion of fuel oil transfer piping is carbon steel that is protected with a waterproof coating and an impressed current cathodic protection system.

Diesel Generator Support Systems

Sections 9.5.4-9.5.8

Conclusions

- Staff's acceptance of the design of the DG fuel oil storage and transfer system is subject to satisfactory resolution of the Open Items related to the NAPS COL FSAR Section 9.5.4.
 - 7-day fuel oil supply
 - industry standards
- Staff concluded that there is no outstanding information, outside of the DCD, related to Sections 9.5.5-9.5.8.

Overview of North Anna RCOL Chapter 9 – Auxiliary Systems

Discussion/Committee Questions

Zinc Injection System (ZIS)

Section 9.3.11

(Backup Slide)

- Section 9.3.11 of the ESBWR DCD states that the ESBWR Standard Plant design includes provisions for connection an optional ZIS. This section also provides to COL items, stating that the COL applicant shall determine of a ZIS is required.
- In response to STD COL 9.3.11-1-A and STD COL 9.3.11-2-A, the applicant has indicated that they will not be utilizing a ZIS.
- The staff concludes that the applicant has addressed this section accordingly and there is no outstanding information expected to be addressed.